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Underlining, &c.—
Engert & Rolfe Ltd.
McNeill, F. & Co. Ltd
Vulcanite, Ltd.
Willesden Paper & Canvas Wks.

Ventilating—
Boyle, R. & Son
Dargue, Griffiths & Co., Ltd.
Ewart & Son, Ltd.
Haywards, Ltd.
Keith & Blackman Co.
Kinnell, Chas P. & Co., Ltd.
Murray, S. D. & Co., Ltd.
Rosser & Russell, Ltd.
Sturtevant Engineering Co. Ld

Wall & Ceiling Covering—
"Arraber" Co.
Beaver Board Co., Ltd
Fiberlic
Machin & Kingsley, Ltd.
O'Brien, Thomas & Co.
Thames Mills (Calno)
Venesta, Ltd.
Young & Marten Ltd

Waterproofing—
Adamite & Co., Ltd.
Callender, G. M. & Co.
Ebner, J. F.
Kerner-Greenwood & Co. (Pudlo)
Super Cement, Ltd.
Titon (Liverpool) Ltd.
Torbay & Dart Paint Co.

Wine Bins (Iron)—
Bayliss, Jones & Bayliss, Ltd.
Farrow & Jackson

Wire Screens—
Moriarty & Co. (1911) Ltd.
Parker, Winder & Achuron

Window Frames & Sashes
Braby, F. & Co. Ltd.
Carron Company
Clark, Hunt, & Co. Ltd.
Crittall Mftg. Co., Ltd.
Haywards, Ltd
Williams & Williams, Ltd.

Wood Flooring—
Acme Flooring and Paving Co.
Improved Wood Pavement Co.
Turpin's
Zeta Wood Flooring Co.

Wood Preservative—
Fuller, John H. & Co. Ltd.
Maclean Wm. Sons, & Co.
Major & Co., Ltd.
Sterns, Ltd.

THE BUILDER

A RECORD OF ARCHITECTURE AND CONSTRUCTION.

WITH WHICH IS INCORPORATED THE "BRITISH ARCHITECT."

VOL. CXIX.—No. 4053. OCTOBER 8 1920.

BUILDING AND THE INDUSTRIAL RESEARCH DEPARTMENT.

WE have often had occasion to press upon our readers the claims of research in the building industry, and the publication of the fifth annual report of the Department of Scientific and Industrial Research contains information of such interest to those engaged in building that it merits special comment. No organisation, be it a Government department or a private concern, can flourish without the support of those whom it is designed to serve, and success in any enterprise must be dependent upon the efficiency of its organisation and the incentive to such efficiency produced by outside interest. At no time in the long history of the building industry has it been so necessary as now to search in every direction for possible economies in construction, using the term in its widest sense—not merely as a means of lessening initial cost, but such ultimate reduction of deterioration as would appreciably increase man-power and material for future undertakings. It cannot be said that in the past the building industry has shown any great vitality in the direction indicated. We see too much of the old British attitude of being too busy making one sovereign to-day to attend to saving ten to-morrow. With international relations, however, growing daily closer it is imperative as a necessity for existence that we keep a close watch on efficiency if we are not eventually to become dependent on other nations, and what this means in cost we know to a small but quite sufficient extent.

To the Royal Institute of British Architects belongs the credit of first realising the possible value to the building industry of the Industrial Research Department, for in the first year of the existence of this Department a very comprehensive programme was put forward and formally discussed. But officialism has its drawbacks and delay seems to be one of them. At length, however, a Board for Building Research has been definitely formed and will co-ordinate and take over the institutional work proceeding under the L.C.C. in this connection, and the results of such *ad hoc* investigations which have already been made under Government authority. We do not see any reference directly to the R.I.B.A. in connection with this new Board, or to any associated body concerned with building, but the success of the movement is so bound up with the attitude of the first Board that we give the names of those who compose it. These are, the Marquess of Salisbury (chairman), Sir Aston Webb, who is referred to as "Past-President of the R.I.B.A.," Sir Gerard Heath, late Engineer-in-Chief, British Armies in France, and Mr. G. W. Humphries, Chief Engineer to the L.C.C.; the Ministry of Health and the Office of Works are also to be represented. We are always ready to applaud the appointment of small committees provided they are composed of workers, but we do not know how much individual initiative is to be expected from the distinguished and much-occupied persons cited. Naturally, much depends on the Director of Research, and we extend a very cordial welcome to Mr. H. O. Weller, of the Public Works Department, Indian Service of Engineers, whose name we think appears publicly for the first time in the Report under review as holding this post, although his appointment dates from some time back. It will be observed that the initiation of this movement would appear to be more in the direction of civil engineering than building as carried on by the building industry, and this is a matter which will require to be watched, and which, we hope, will not escape the attention of Sir Aston Webb. We believe, however, that Mr. Weller possesses some architectural experience obtained earlier in his career, and we hope that he will give this full scope in drawing up his programme. The Institutions of both Mechanical and Civil Engineers are quite alive to the importance of research and have already many facilities for conducting investigations; what we want this Board to do is to concern itself with the immediate needs of the architectural profession and the building industry. As stated, a series of pressing problems covering a wide field has been put forward by the R.I.B.A., and we very much hope that a definite programme will be published and comments on its utility invited from those interested. The Department must be supported by the interests which it serves, and it can only obtain such support by obtaining the wide collaboration of industry in its work. We have had various statements from authoritative trade bodies endorsing the importance of research, but we are not aware of any detailed programme submitted by the trade, or, indeed, of any direct trade representations to the Department indicating the specific needs to enable economy and efficiency in building to be increased.

The activities of the Department have been largely concentrated on the formation of Research Associations, which are non-profit trade associations, formed for the purpose of common research interests by groups of trading bodies, and assisted financially by the Department, usually to the extent of half their expenses. These Associations have certain obligations into which we cannot enter here and, of course, though non-profit concerns directly, they do profit materially, and that at the national cost, by the results of the researches which they undertake. The encouragement of research in this manner may be justified up to a certain point, but research entirely in the public weal is very much more to our taste. Hence we are especially glad that the building industry has been treated in the manner to which we are drawing attention. A Research Association for the industry would have meant ultimate benefit at national cost to a few enterprising firms or groups of prospective patentees, whereas the formation of a Board means that all results will be equally available for the benefit of any architect, builder or manufacturer who does not allow such results to pass unheeded. Hence there is every reason that the industry should take an active interest in the work of the Board, and that the Board should reduce officialism to a minimum and encourage the industry to display such interest.

Though other activities of the Department are not of such moment to us we may finally touch upon some of them. The aims set out are to encourage individuals in pure science researches; to organise associations above alluded to; to direct and co-ordinate national researches, and to aid existing institutional researches. During the last year some £27,000 has been devoted to the first purpose; to the second some £64,000 has in all been devoted, and further heavy commitments are cited. National research appears to have been so far concentrated in the National Physical Laboratory and the Fuel Research Board, while over the five years some £69,000 has been devoted to institutional researches of a more or less private nature. The Department has absorbed the National Physical Laboratory, and now the Geological Survey and Museum. It is, therefore, a powerful body, able to do much public service; at what official outlay does not appear, but we think that some statement under this heading should be included in future reports.

NOTES.

Difficulties of Output in Bricklaying.

With regard to bricklaying, a correspondent says: "If the limitation of output is miserably inadequate in relation to the capacity of a good average workman, cannot the Union take steps in the interest of the country to secure an improvement; the prosperity of the country at large and of the workmen ought to run together." We draw our readers' attention to a practical suggestion made by Professor C. H. Reilly on page 391. Our correspondent is sanguine enough to suggest that if the Union were approached some action might be taken to improve matters. Who will take the initiative?

Threat to the Old Deanery, Wolverhampton.

It seems almost incredible after the continuous and urgent claims which have been heard in recent years that an old house such as the old Deanery at Wolverhampton should be thr atened with demolition. At present its existence appears to depend on the will of the local authority; but if anything could secure its safety surely that should secure it! All enlightened local authorities are nowadays aware of the value of the few beautiful old buildings still left to them—we say "enlightened." We should like to see the plans which we believe Messrs. Forsyth & Maule prepared for the preservation of the old house in connection with the new technical school. Writing to the *Times* with reference to the proposal of the Wolverhampton Town Council to destroy the Deanery House, in order tc erect a technical school on the site, Earl Ferrers (Hon. Secretary of the Society for the Protection of Ancient Buildings), says: "In these days of building shortage the needless destruction of a good house seems a strange thing. Its destruction by the council of a county borough seems stranger still. It is to such bodies we look to husband our building resources. But when the house in question is a perfectly charming piece of brick building by Sir Christopher Wren and the destruction of this educational asset is threatened in the name of education, strangeness passes into nightmare." Lord Ferrers bases his protest on behalf of housing, economy, and common sense.

City Markets and Congestion.

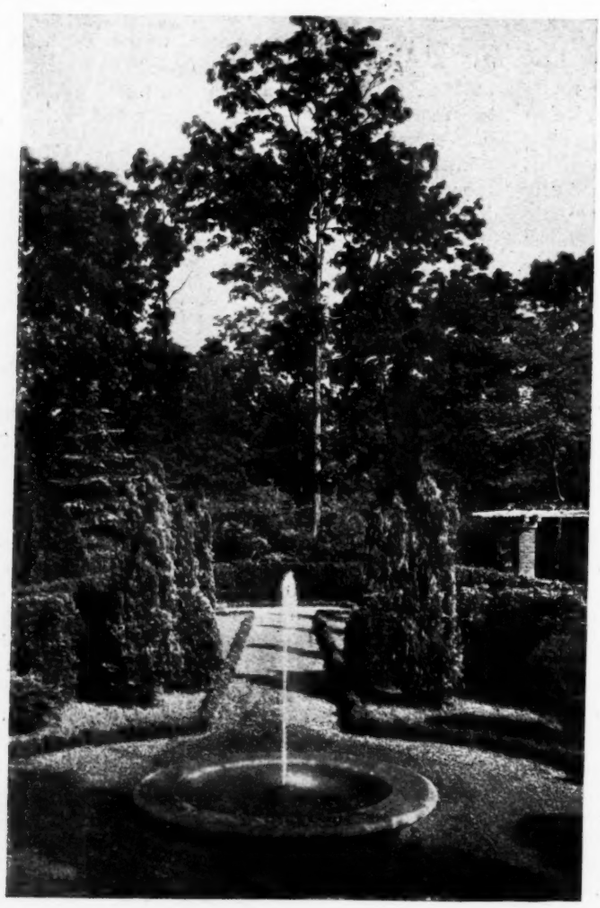
The public are beginning to realise how serious a matter is the question of transport both of goods and passengers, though it is a slow awakening when one remembers how for years the congestion of traffic has been so painfully felt in all the streets leading to Covent Garden Market and those about Billingsgate. The agitation as to the removal of Billingsgate has broken out again and, of course, there are ample reasons produced both for and against. The proximity to the river is a good one for its situation; but what shall we say about Covent Garden and the stream of traffic carrying goods from it to the south side of the river, and its noisomeness, in the centre of exceptionally busy and valuable thoroughfares? We are surely a long way off the first necessities of wise town planning. For Billingsgate it is urged that it is the one ideal spot for distribution, and that it might very well swallow up the Custom House, which could do its work better in more dignified surroundings, whilst the spacious and unused wharf in front of it might give increased area to Billingsgate and disperse most of its troubles at once!

"Subsidy" Houses.

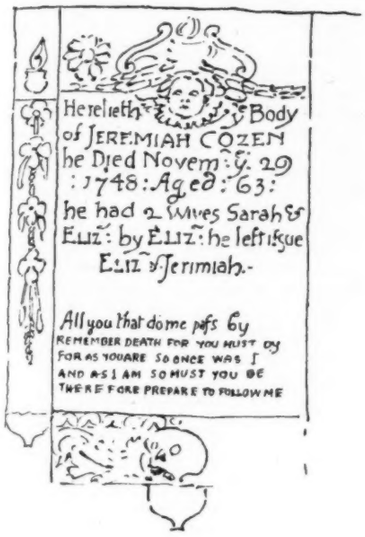
Although the Housing (Additional Powers) Act is producing houses by means of the Government subsidy, there is little doubt that some of these buildings are of a very unsatisfactory character. One of the chief reasons advanced to justify Government interference in housing was that the standards generally were to be raised, and that, if the taxpayers' money was to be somewhat lavishly disbursed, at least it would only be for well-designed buildings properly laid out and disposed on healthy sites. The plans were to be carefully examined by competent technical officials whose duty it would be to see that these high standards were maintained. For the "subsidy" house, however, no such supervision is insisted upon, and provided that the accommodation of the individual rooms meet the requirements of the Ministry of Health, no check is placed upon the disposition of the rooms themselves within the building. Consequently, ill-lighted, badly-ventilated, dark, unpleasant houses are springing up in many places. Had it been made compulsory that competent architects should be employed to design "subsidy" houses this state of affairs could never have come about. We can only hope that the time may soon be when houses are designed only by those of whose competence there is no question.

Housing Statistics.

We have already alluded to the way in which local authorities who desire to embark upon housing schemes by direct labour are required by the Ministry of Health to furnish various complicated statistics and diagrams. We are now informed that



Fountain in Garden, U.S.A. Mr. James L. Greenleaf, Architect.


Herelieth the Body
of JEREMIAH COZEN
he Died Novem: y. 29
: 1748: Aged: 63:
he had 2 Wives Sarah &
Eliz: by Eliz: he left Issue
Eliz & Jeremiah.
All you that dome pfs by
REMEMBER DEATH FOR YOU MUST DY
FOR AS YOUARE SO ONCE WAS I
AND AS I AM SO MUST YOU BE
THEREFORE PREPARE TO FOLLOW ME

"a very considerable portion of the staffs of the Housing Commissioners are now engaged on work of this kind. Various complicated systems of card-indexing and charting of the various schemes have now been introduced, in order, it would seem, to satisfy a morbid curiosity for figures and graphs which seems suddenly to have broken out amongst the higher officials in the Housing Department of the Ministry of Health. If the demand for these details had been made at the outset they could have been supplied contemporaneously with the schemes themselves, but this sudden and apparently whimsical demand must, one would think, inevitably delay the erection of more houses, and the passing of more plans." The Ministry has still a long way to go if it intends, even approximately, to fulfil its programme, and to divert energy in this way is certainly not conducive to expedition.

Labour for Housing. We are informed by the Ministry of Health that up to the beginning of September only 60 per cent. of the skilled labour required for housing schemes was available. The number of men employed was 22,397, and the number needed was 37,132, leaving a deficiency of 14,735. This deficiency was made up as follows:—8,218 bricklayers, 3,785 carpenters, 651 slaters and tilers, 1,127 plasterers, 487 plumbers, and 467 painters and glaziers. "With the exception of the last two trades," says the Ministry, "these figures represent an increase in the numbers required in every case over those notified last month." This official statement reached us on the same day that Sir Kingsley Wood, Parliamentary Secretary to the Ministry of Health, speaking at Tottenham, said: "The shortage of labour in the building industry is a disastrous and disgraceful state of affairs when it is remembered that some 200,000 ex-Service men are unemployed at this present hour. There will be unemployment this winter. Can it be tolerated that this should exist at the same time as a labour shortage on house-building? The appeal that has been made to trade unions to relax some of their conditions is not to provide houses in Park-lane or for cinemas, but to house their fellow-workers."

The Necessity for Augmentation. It was announced some weeks ago that the Government and the Resettlement Committee of the Industrial Council for the Building Industry had, after very lengthy negotiations, agreed on a scheme whereby the available supply of labour would be increased by the admission of ex-Service men and by increasing the number of apprentices. This scheme was to be the subject of immediate action, but we understand that the matter has not yet been submitted to the trade unions concerned owing to a "hitch" having arisen with regard to the details.

London's New Tower. It will be interesting to note what will be the opinion of the public on the tower of the new Dock Offices now appearing clear of scaffolding against the sky. Its battering sides and truncated top give it a sturdy emphasis and a unique character amongst London towers and spires, with a distinct novelty for the jaded architectural appetite.

Trade Unions and Overtime. We take the following from a daily paper:—"Overtime cannot be worked on Stafford's municipal houses because the men's trade union forbids it. The men had been working extra time at their own request, but the union threatened to stop other work on the houses unless the men worked only the ordinary hours." What does Dr. Addison say to this?

A Fine Architectural Publication. Another link in the chain of evidence for the outstanding quality of English domestic architecture has been forged by Messrs. Batsford in the fine volume on "The English Interior," by Mr. Arthur Stratton, just issued. It says something for the appreciation of the public, no less than for the enterprise of the publishers, that a book so beautifully produced is a possibility to-day. But there it is, as good as anything Batsford's have ever issued with a list of nearly 1,200 subscribers. The published price is 4 guineas.

Garden Fountain, U.S.A. Mr. James L. Greenleaf, Architect.

GENERAL NEWS.

Professional Announcement.

Mr. S. B. Caulfield, F.R.I.B.A., has removed from 23, Old Buildings, Lincoln's Inn, W.C., to 1, Woburn-square, W.C. 1. Telephone, Museum 4110.

The City School Memorial.

The war memorial tablet at the City of London School (designed by Sir Banister Fletcher, F.R.I.B.A., and illustrated in our issue for November 28, 1919), was unveiled by the Lord Mayor on Friday last week.

The Worshipful Company of Plumbers.

Dr. Frederick Joseph Waldo, M.D., J.P., has been elected Master of the Worshipful Company of Plumbers for the ensuing year, Mr. Ernest Samuel Beal, C.C., Warden, and Mr. J. B. Wilkinson, R.P., Renter Warden.

Mausoleum as a War Memorial.

Mr. George P. Allen, F.R.I.B.A., is preparing sketch plans for the Beds and Herts Regimental War Memorial, which, as stated in our last issue, is to take the form of a mausoleum. Mr. Allen is basing his plans upon the contemplated site opposite Kempston Barracks.

South Wales Institute of Architects.

A large number of members of the Western Branch of the South Wales Institute of Architects recently paid a visit to Margam Park and church. The party was conducted over the church by the vicar, and afterwards was shown the Abbey ruins and the Orangery.

Famous Castle Burnt.

It is reported that Schloss Eltz, on the Moselle, one of the most famous of mediæval castles, renowned for its historical associations and its beautiful position in romantic scenery, has been destroyed by a fire which lasted for twelve hours. The bulk of the contents of the castle were saved.

Poole Development Scheme.

A proposal has been submitted to the Poole Harbour Board for the development of the town as a first-class port. The scheme involves the deepening of the channel from the present average depth of 16 ft. to 26 ft., to permit the entry of large vessels, and the ultimate provision of 18,000 ft. of new wharves, at a total cost of £3,250,000.

The Rome Scholarship in Sculpture.

On the recommendation of the Faculty of Sculpture of the British School at Rome, the Commissioners for the Exhibition of 1851 have awarded the Rome Scholarship in Sculpture (1920) to Mr. Alfred Frank Hardiman, of London. Mr. Hardiman in 1911 entered the Northampton Institute, and studied for a short time under Mr. Charles Hartwell, A.R.A. While there he won the London County Council scholarship for a three years' course at the Royal College of Art. In 1914, with the aid of a special scholarship awarded by the London County Council, and a British Institute Scholarship, he entered the Royal Academy Schools, where he won the Landseer Scholarship. The Rome Scholarship is of the value of £250 per annum, and is tenable at the British School at Rome for three years.

The Threatened City Churches.

The Rev. J. H. J. Ellison, rector of St. Michael's, Cornhill, preaching before the Lord Mayor in the church of St. Laurence Jewry last week, outlined a scheme suggested by City rectors for retaining the nineteen City churches which the Bishop of London's Commission proposes to demolish. There must be, he said, a large amalgamation of existing parishes. The City clergy whose places of worship had ceased to be parish churches would retain their status as City rectors, at the same time becoming resident incumbents of new suburban parishes, their main work lying not in the City but in the suburbs. The incumbent and probably the curate would be paid from the revenues of the connected City church, and help would be afforded from City church funds in the building of the suburban churches. It was proposed to create a permanent co-ordinating Commission, representative of all the interests concerned. He suggested that without secularising the City churches valuable social work might be done there apart from Divine worship.

Regimental War Memorials.

The Battle Exploit Memorials Committee has announced that 140 claims have been registered to erect memorials to separate battalions, brigades or larger bodies in nine different countries. The *Times* last week contained an article describing the war memorial proposals of many regiments, from which we take the following:—The Seaforth Highlanders are endeavouring to raise a sum of £50,000, part of which is to be subscribed towards the Scottish National Memorial at Edinburgh Castle, and the erection of an Iona cross on Vimy Ridge; the Gordon Highlanders have decided to erect a memorial club at Aberdeen, at a cost of £40,000; the Camerons have decided to endow a similar institution and to contribute towards the cost of the Scottish National Memorial; the Royal Scots have decided on the erection of a memorial at Edinburgh; the Cameronians are considering a scheme for the erection of a monument at Neuve Chapelle; the Loyal North Lancashire Regiment are to erect a monument at Vendresse; a stone column is being erected at Fricourt on behalf of the Yorkshire Regiment; the York and Lancaster Regiment are to erect a memorial in Sheffield, with replicas in other towns with which it is associated, a tablet in York Minster and a memorial on the Ypres-Menin road; a monument is to be erected at Ypres to the Monmouth Regiment; the Gloucestershire Regiment are erecting a stone monument near Hooge. Several regiments are also subscribing towards Divisional memorials.

MEETINGS.

Friday, *October* 8.

Architectural Craftsmen's Society.—Presidential Address, by Mr. J. C. Bannatyne. At Royal Technical College, Glasgow. 7.45 p.m.

Wednesday, *October* 13.

British Museum Lectures on Ancient Architecture.—Sir Banister Fletcher, F.R.I.B.A., on "The Sphinx, the Pyramids and other Tombs." At the British Museum, Bloomsbury. 4.30 p.m.

Thursday, *October* 14.

Society of Architects.—Mr. C. M. Lyman on "Central Heating of Small Houses." At 28, Bedford-square, W.C.1. 8 p.m.

War Memorial. By Mr. Charles J. Hartwell, A.R.A.

CORRESPONDENCE.

Salaried Bricklayers.

SIR,—Most architects and builders at the present time must be worried, if not annoyed, at the casual treatment their work receives at the hands of the bricklayers, who, if they are to be found at all, take up and throw down their jobs with a light-heartedness and irresponsibility difficult to overstate. It may be said with some truth that this attitude by the tradesmen in question is the natural outcome of the method of their employment in past times. The bricklayer in the past has known that when his wall reaches a certain height he will be knocked off and have to walk the streets until he can find another job. Obviously such a system of employment cannot be conducive to hard and continuous work, and, now that the boot is on the other foot, and it is the bricklayers themselves that are in demand, it is not surprising that they treat their employers in very much the same casual way they themselves have been treated in the past. What, then, is the remedy? Surely it is to be sought, where it has been found in other similar cases of intermittent labour, in organisation.

The small contractor is not, perhaps, in a position to employ regularly over long periods even one bricklayer. His work may be chiefly internal jobbing repairs; but occasionally he needs one, and at present he finds the greatest difficulty in getting a man. The same thing applies to the contractor in a larger way of business. He has not enough work always on hand to employ continuously more than two or three bricklayers, but occasionally he wants a dozen. It is only the big contractor who can give regular employment to a large number, and consequently he is in a better position to meet the needs of clients. More and more, therefore, the tendency is for architects and others to put building work into the hands of the big builders, to the detriment of the small men who can give, and often do give, a great deal of personal attention to their work, a thing not to be lightly lost in the interests of good building.

The suggestion for better organisation which I venture to make as a solution of the difficulty is a suggestion which would, I think, not only help the architect and his client, but the small builder, whose disappearance we should all regret. Briefly it is this:—That the local federation of building employers in each district should itself employ on a monthly, or even longer, engagement a certain proportion of the number of bricklayers in the district, say, 30 per cent., and pay them a definite weekly wage based on the current rate of wages. These salaried men should be carefully selected as the best bricklayers in the district—men personally known to members of the federation. Each member of the federation should then draw on this pool of skilled labour in proportion to his requirements, and on a scheme of precedence to be determined by the members. The individual employers would recoup the federation for their services and for the time spent in moving the men from one job to another. If the percentage of salaried bricklayers in any district were kept low enough the federation would stand to lose nothing. The great gain, apart from the fact that every member of the federation could be ensured the services of at least one bricklayer, would be that the men themselves would in time, through continuous work, gradually lose the casual spirit and outlook on life which the present arrangement fosters. The sense of responsibility which a permanent job gives would grow, and I think it might safely be assumed that the best men would seek to become the salaried employees of the federation. If found successful with bricklayers, the scheme could be extended to other trades. But until some such organisation is introduced into the methods of employment it seems to me useless to complain of the casual habits of the men when those habits are the natural result of the way in which they are at present employed.

C. H. REILLY, M.A., F.R.I.B.A.

Liverpool.

London University Site.

SIR,—It appears a foregone conclusion that the Government has adopted the Bloomsbury site. No doubt it has much to recommend it, but a great institution such as the representative nation of the English-speaking community—of humanity, in fact—ought to become possessed of, should not be cribbed, cabined and confined to an altogether inadequate section of the central aggregation. It is a pre-war idea, and our vision of the requirements of the future has since been vastly expanded. Even then, however, a far larger and quite as suitable central site on the south-west slope of Pentonville Hill was pointed out by the author. It is now proposed that it should be known as the King's Cross site.

Another suitable site, in Hyde Park, has recently been described. Its adoption would practically mean the releasing of £1,000,000 as a gift to education, and cannot lightly be dismissed. The question is one for Parliament, as also is the interference with the parks in that and other ways—a subject fraught with the utmost consequence to London improvement in all its aspects. In the margins of the parks as building sites London possesses an asset of gigantic importance, the realisation of which would go far to meet urgent requirements in other directions, especially if applied, say, in the clearing of the slums. By a *quid pro quo* judiciously administered much and real good to London and humanity might be brought about.

"O. B. I. T."

London.

The Architects' and Surveyors' Assistants' Professional Union.

SIR,—I have recently had the pleasure of making a tour of certain of our provincial centres, and, though it is much to be regretted that all could not be visited, the reception I have everywhere received—in Liverpool, Manchester, Leeds, Glasgow, Edinburgh and Newcastle—has convinced me more than ever of the strength and vitality of the Union; it is even stronger in the North than in London. Could any sceptic as to the Union's purpose and utility have accompanied me he would have come away convinced that the desire for active professional fellowship is real. The assistants not only desire efficiency, personal and corporate, but also fair payment for work done, a levelling up to the higher standards at present prevailing, and ultimately a levelling up of their professions to their proper places among the others. The Union demands a higher standard of professional etiquette than has previously prevailed, and a greater consideration of one professional man for another.

Each meeting received these ideals with enthusiasm. The ideal of right, of hatred of wrong and of righting all wrongs, has been everywhere preached and everywhere received; the principle that the labourer is worthy of his hire; of the necessity for a high standard of work and its corollary of a high standard of remuneration; the principle of unity, of oneness, of the closest co-operation, of co-operation between employer and employed and the real employer—the whole community outside; the necessity for faith in our ideal, which must be steadily shown by loyalty and obedience to elected leaders, and by maintained zeal and enthusiasm for hard work; all this has created more enthusiasm and has brought more members than if the Union had preached the gospel of greed.

Addressing these meetings I have been able to watch the characteristics of the citizens of each city, and an intimate knowledge of these varying characteristics is essential to the Executive if it is to govern in the best interests of its members. The contrast between Liverpool and Manchester—the one cautious and conservative, the other firm in the belief that the engine of reform must go full-steam ahead if reform is to be achieved—is very strongly marked. Or again, Glasgow and Edinburgh, the first strongly commercial and a little cosmopolitan, the capital conservative and strongly national, and yet even more enthusiastic for reform, but both Scottish, and each meeting much more patient than a London meeting. The Leeds meeting again was enthusiastic, but it was the enthusiasm of the Yorkshireman, the whole argument being well weighed up beforehand, and very heartily endorsed. The Newcastle meeting, on a Saturday night, was packed with 50 per cent. of the members. It has been said that the better class of assistant would hold aloof from the Union, but the type of assistant at these meetings was the very best.

There was one question asked me at the Edinburgh meeting which deserves every publicity. "Was the Union doing anything as to the unlimited apprenticeship system prevailing in Scotland, whereby professional men took apprentices who, after serving their time, could on account of their numbers never be placed in the profession?" I was able to state that the Executive of the Union was taking this matter up very strongly, and realised that (1) only those fitted for the profession should be allowed to enter it, (2) the number of entrants must be strictly limited to the demands of the profession.

The Union has grown strong during the eighteen months of its existence. That it is representative there can be no doubt, that 95 per cent. at least of salaried architects, surveyors and other assistants think with the Union there is also no doubt, and I should like to ask, therefore, all those who have not yet come forward to join to do so now.

CHAS. MCLACHLAN.
Hon. General Secretary.

33, Tothill-street, S.W. 1.

The Church of Notre Dame, Dinant.

SIR,—In your issue for September 17, you state that the Church of Notre Dame, Dinant, was destroyed by the Germans. This happily is not a fact. The bulbous spire between the towers was burnt in September, 1914, during the battle with the French for the Citadelle, and the subsequent pillage of the town. Except for some slight damage to glass and chipped stones, the church was untouched, and was in use by the inhabitants throughout the German occupation. The tragedy of Dinant was only equalled by that of Tamines and Louvain, but although the greater part of the houses were destroyed the church has survived the ruin.

Purley. L. E. WILLIAMS, Major.

[We are very pleased indeed to receive the above information from Major Williams, and we are sure that all architects will be gratified to know that this building has escaped, in part at least, from the general destruction. Our notes, published with the illustration, were from general information, and without special knowledge, which could only be obtained by a visit to the building.—ED.]

Building Surveyors and Inspectors.

SIR,—The letter of Mr. Wm. A. Warwick, M.R.S.I., in your last issue has been drawn to the attention of the Executive of this Union. I am to point out that this Union, which has been in existence since March of last year, already includes a number of this class of employee, and is now in a very strong position. It has also recently taken up the case of the salary of a building inspector under a local authority, and we feel that attention should be drawn to these facts.

CHAS. MCLACHLAN, A.R.I.B.A.,
Hon. General Secretary, Architects' and Surveyors' Assistants' Professional Union.

33, Tothill-street, S.W.1.

Cracks in Cement.

SIR,—Allow me to thank you for kindly inserting my letter in *The Builder*, in consequence of which, in addition to your valuable editorial comments, I have received many interesting suggestions.

WEARDALE.

Brasted Chart, Kent.

SAN GIMIGNANO.

By Sidney Toy.

It is not often, even here in Italy, that mediæval life and surroundings are presented at the present day with such accuracy and force, unqualified by the usual touches of modern feeling, as is the case with San Gimignano. The town stands on a hill about 8 miles north of Siena and 7 miles west of Poggibonsi, the nearest railway station. It has gradually declined in importance since the 15th century, and it is on this account, together with its comparative isolation from the more advanced means of communication with the outside world, that its present condition is due. But to these same circumstances it owes its peculiar attraction and charm, and to all who would study mediæval Italy, unoffended by those jarring elements so prevalent elsewhere, San Gimignano offers a perfect haven and an almost inexhaustible field.

The town may be approached from Poggibonsi either by carriage or on foot. For the first 3½ miles the road traverses fairly flat country surrounded by high hills, after which it begins to ascend, and when within about 2 miles of its gates San Gimignano, with its imposing group of towers, bursts suddenly into view. On approaching San Gimignano the road begins to zigzag very considerably, and often the town is obscured from view. Short cuts suitable for pedestrians exist, but great care is necessary in taking these when the town is out of sight or the road is lost entirely, as was the writer's experience during one of his divergencies from the main way. He, however, eventually struck another road and found that he had gained considerably in distance and reached a hil immediately opposite the town from which a close and comprehensive view of its towers and walls could be obtained.

The history of the town begins with the record of its struggles with the neighbouring city of Volterra, to whose Bishop it was subject, from the early part of the 10th century to 1199, when the two rectors, hitherto appointed by the Bishop of Volterra, were replaced by a Podestà elected by the commune. Up to this latter date the town must have been very small, judging from the remains of its early boundaries, including the north and south gateways, which still exist; but early in the 13th century the present wall enclosing a much wider area was built. Palaces and houses then sprang up in all directions and the century and a half before 1353—when the commune surrendered its independence to the Republic of Florence—though chequered by intermittent war with its neighbours without, and continual strife between its two chief families, the Ardinghelli and the Salvucci, within, was doubtless the period of its greatest power and importance. It was in 1300, when at the apogee of its power, that the town received an ambassador from Florence in the person of Dante, who came to invite the commune to send representatives to a parliament formed to elect a captain of the League of Tuscany. After its surrender to Florence—brought about by the mutual jealousy and turbulence of the Ardinghelli, adherents to the Guelfs, and the Salvucci, supporters of the Ghibellines—the town continued to be involved in the more general struggles between these great factions, but from the 15th century its importance was on the wane, though its municipal functions were noted for their splendour down to a much later period.*

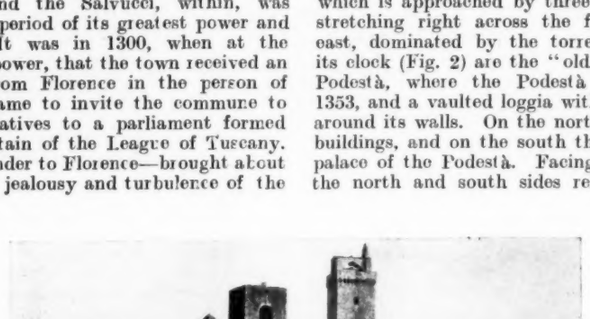


Fig. 1.—San Gimignano: General View.

Fig. 2.—The "Old" Palace of the Podestà, San Gimignano.

As we approach the walls the bastions erected by the Florentines in the 15th century come into view and, entering from the south below the machicolations and through the round arch of the Porta S. Giovanni, we arrive in the via S. Giovanni. Having traversed this street and at the further end passed through the Arco de Becci, the south gate of the more ancient walls, we are in the centre of the town, where the principal squares, the Piazza della Collegiata and the Piazza della Cisterna communicate with each other.† We are at once struck with the mediæval character of the place. The streets are narrow, paved with large stone slabs which fall towards the centre, and have no footways. The houses are tall and of mediæval or Renaissance date, principally of the former, and are built generally of stone, though brick of a deep red colour, especially in the later work, is used. The roofs are covered with dark brown tiles.

Perhaps the most striking feature here is the wonderful group of tall towers (Fig. 1). These originally numbered twenty-five; some have been pulled down, others exist to the roof line of the houses to which they are attached, and about thirteen still project to varying heights above the roof line. Apart from the campanile of the Collegiate Church and the two municipal towers these structures were built by the chief families of the town, formed a part of their palaces, and were used for the purposes of offensive and defensive operations in times of disturbance. Corbels and holes for the beams of the staging, thrown out as occasion required for these operations, and sometimes probably used as platforms from which to witness the state functions, are still to be seen on the faces of the towers (Fig. 2). An order was made that these private towers were not to exceed the height of 167 ft., and the tower of the "ancient" Palace of the Podestà, the torre Rognosa, marked this limit. The principal square, the Piazzi della Collegiata, is bounded on the west by the Collegiate Church, which is approached by three flights of steps stretching right across the façade. On the east, dominated by the torre Rognosa with its clock (Fig. 2) are the "old" palace of the Podestà, where the Podestà resided before 1353, and a vaulted loggia with a stone bench around its walls. On the north are other tall buildings, and on the south the lofty "new" palace of the Podestà. Facing each other on the north and south sides respectively were the palaces of the Salvucci and the Ardinghelli, while standing round about the Piazza, which is not large, are seven lofty towers.

From the top of the stairway by which the entrance to the "new" palace of the Podestà is reached, a stone pulpit projects on corbels (Fig. 3). This position commands the whole Piazza, and it does not require much imagination to picture this place crowded with people during an occasion of great emotion in the middle ages, standing on the steps before the church, in the loggia, on the pavement of the Piazza itself, and in the numerous windows of the buildings all around it while the Podestà steps out on to the pulpit and addresses the

Fig. 4.—Interior of the Collegiate Church, San Gimingano.

* For a more complete history vide "Storia della Terra di San Gimignano." By Luigi Pecori. Firenze, 1853.

† These have now modern names, Piazza Vittorio Emanuele and Piazza Cavour, respectively.

assembly. There is nothing in the present aspect of the place to impede the course or qualify the effect of such a mental picture. It was from this pulpit that, after 1353, the Podestà, on entering office, presented his credentials and received the baton and keys from the Gonfaloniere, and it was at the steps leading up to it that two young men of the Ardinghelli were arbitrarily beheaded in 1352.

The Collegiate Church (Fig. 4) dates from the 11th century, but was considerably remodelled in the 14th, when the nave was vaulted and other alterations made. Its façade to the Piazza, now stripped of the Renaissance stucco with which it was at one time covered, is bold if somewhat bare in character. The campanile stands near the choir well back from the façade. It has large, open, bell-chamber windows and was apparently crowned by a pyramidal spire, as shown on a fresco in the chapel of S. Fina*, but this has since been removed.† The nave arcades are supported on round pillars with carved capitals of the early period, but evidences of the later work are abundant elsewhere, while the choir and eastern chapels were constructed in 1466. On the walls of both aisles is an interesting series of 14th century frescoes representing scenes from the Old and New Testaments, while on the wall at the back of the nave‡ is a Last Judgment, with gruesome details, by Taddeo di Bartolo; and below it a fine painting of the martyrdom of St. Sebastian by Benozzo Gozzoli, executed in 1465. At the end of the right aisle is a beautiful 15th century chapel and shrine of S. Fina with fine frescoes of the life and burial of the Saint.

* That of the burial of S. Fina, by Dom. Ghirlandajo, c. 1475.

† This tower is easily indentified on Fig. 1 by its large windows.

‡ Like S. Peter's and S. John Lateran at Rome the nave of this church is on the East.

Fig. 5.—Courtyard of the "New" Palace of the Podesta, San Gimignano.

The "new" palace of the Podestà was built during the last years of the thirteenth century and the tower was added early in the fourteenth. Though its windows have been somewhat altered and its decoration subdued, the building is well preserved. An archway through the palace leads to a very charming courtyard having a wide stone stairway with a pent roof, and a great wall arcade supporting an open gallery to which the stairway leads (Fig. 5). Below the stairway in a wide arched recess is a well with stone head. In the council hall are some remarkable frescoes. On three sides of the room scenes of hunting, jousting, and mythic incident, dating from the end of the thirteenth century, display a vigour of treatment which is most inspiring; particularly is this the case in the combats between two knights and between a centaur and winged monster. The corresponding scenes on the other side of the room were replaced in 1317 by a great fresco, occupying practically the whole wall, by Lippo Memmi, depicting the Virgin with Child enthroned and surrounded by saints and angels while the Podestà of the day kneels before her.*

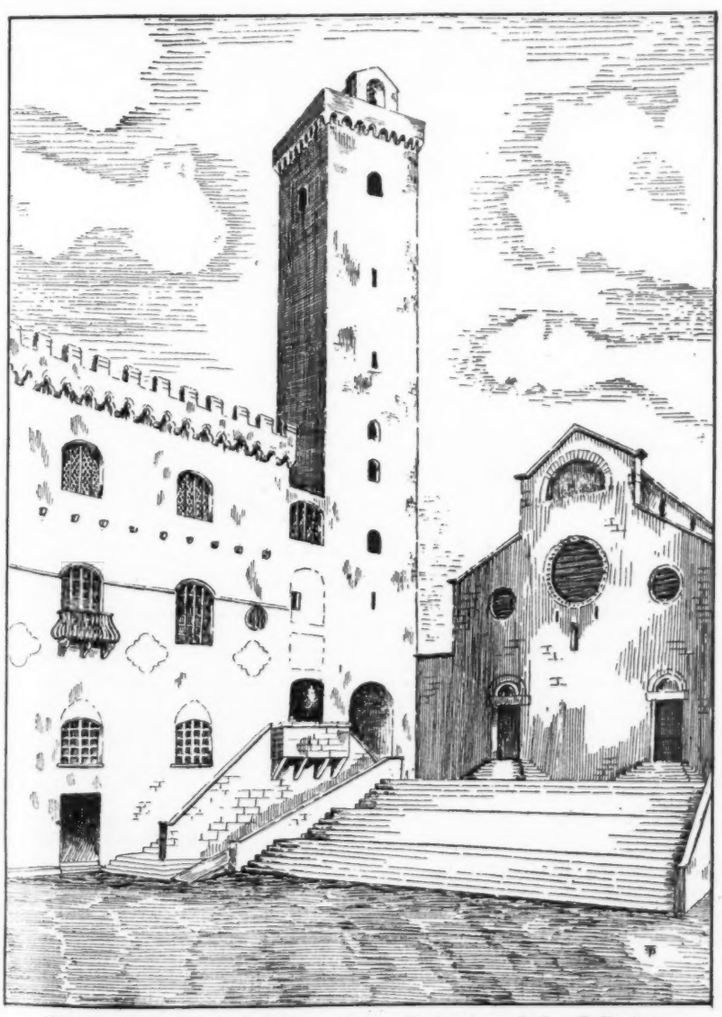


Fig. 3.—The "New" Palace of the Podesta and the Collegiate Church, San Gimignano.

The Piazza della Cisterna is a triangular shaped space having at its base, on the west, the principal face of the palace of the Ardinghelli, with its two towers considerably truncated and pierced by modern wide arches; here the corbels and holes for the staging are in great profusion. On the north of the piazza are the tower and remains of the palace of the Picchiena, and on the south the fourteenth-century palace of the Friani. This last is a charming building of three stories with twin-pointed windows divided by a pillar with carved capital and enclosed by a pointed arch with ornamented label. The tower here has been taken down to the roof line. In the centre of the piazza is a large octagonal well of 1273, from which the open space derives its name.

In the Via S. Giovanni are palaces and houses of interesting character and the eleventh-century arcaded front of the Church of S. Giovanni. Though the palace of the Salvucci in the Via S. Matteo has been dismantled its two tall towers, seen to the extreme left on Fig. 1, still remain. Other palaces in the Via S. Matteo, with their twin windows and arcaded eaves courses, particularly the lofty tower-palace of the Pesciolini, the north gateway of the ancient wall (called the Arco della Cancelleria), which crosses this street, the churches of S. Agnostius, S. Bartolo, and S. Pietro, as well as the Porta S. Matteo, the Porta Alle Fonte, and the great fountain beyond the walls to the east of the latter are all of great interest, but it is hoped that sufficient has been said to indicate the fascinating character of the town.

Scarcely less attractive than its architectural features are the manners and customs of its people and the general mediæval atmosphere pervading its streets. Water is carried from the wells by women and children in elegant bronze vessels of which an example is seen in Fig. 5. The writer was unmolested by beggars, post-card sellers, or guides. The people appear to be industrious and are certainly genial and kind. In all respects it is a town of the fifteenth century except that it is now free from the continual tumults of its townsfolk and the almost incessant strife with its neighbours. We must not forget, however, that as the decadence of the town has followed its comparative enervation, so did the period of its affluence synchronise with that of its greatest energy and pugnacity.

* This was restored and added to by Gozzoli in 1467.

RESEARCH IN THE BUILDING INDUSTRY.*

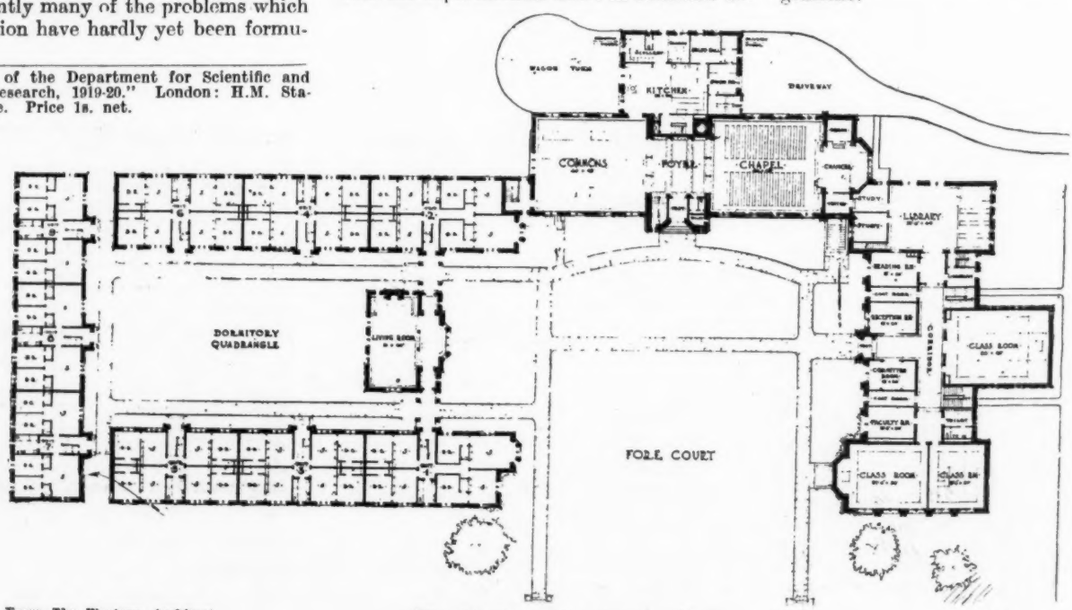
We have received a copy of the Report of the Department for Scientific and Industrial Research, which has just been published, and which is of especial interest, firstly, as containing a summary of the five years' work of this Department since its creation, and, secondly, as giving the first public intimation of the initiation of a new Board of Building Research. The general aspect of the Department's work forms the subject of our leading article, but some more specific details may be given here as a review of this publication, the 120 pages of which contain much interesting matter. As research in industry generally is an essential for national progress, investigation quite outside the sphere of building may have a very marked indirect benefit to the building trade, and should, therefore, be followed. The opening report to the Privy Council occupies ten pages and deals with new responsibilities recently assumed. The new Building Research Board is referred to, the taking over of the Geological Survey, the Fuel Research Station, the National Physical Laboratory, the Food Investigation Board, and questions of general expenditure. Part I deals with Industrial Research Associations. Nine new associations have been formed, including such diverse subjects as rubber, linen, glass, sugar, non-ferrous metals, refractories, shale oil, leather and laundering, while five others are ready for the necessary licence to begin work. We note the remark on page 39: "It will be necessary in every case to draw up careful agreements for safeguarding the interests both of the Research Association and of the firm in whose works the investigations are carried out." We take it that the national interest is included in the former. This is a very important aspect as the nation contributes quite half the expenses involved.

Part II deals with National and Imperial research, and ranges from the supply of radium to the preservation of Assyrian tablets in the British Museum; thirty pages are devoted to this section. We are glad to note the further development of the Records Bureau to prevent over-lapping and assist concerted action. Timber is mentioned, but apparently many of the problems which await solution have hardly yet been formulated.

Part III deals with aided researches, grants, patents and publications of learned societies, and the report concludes with seven appendices occupying more than twenty pages, mostly statistical and informative as to committees and individuals, but containing also an interesting account of the position of research in Colonial and other countries. It is not every man of science or every progressive firm that agrees with the departmental effort in scientific development, but having regard to our national position in things scientific, we think that this Department, with the great powers now in its hands, can do much of the highest value for industrial progress, and we hope that in reviewing its next report we may be able to give our readers some interesting news on the work of the newly-formed Building Research Board, which has not as yet published any programme.

* "Report of the Department for Scientific and Industrial Research, 1919-20." London: H.M. Stationery Office. Price 1s. net.

From *The Western Architect.* **The Wartburg Seminary.**
Messrs. Perkins, Fellows & Hamilton, Architects. (See p. 395.)



From *The Western Architect.* **The Wartburg Seminary.**
Messrs. Perkins, Fellows & Hamilton, Architects. (See p. 395.)

COMPETITION NEWS.

St. Marylebone.

The designs of Messrs. H. V. Ashley & Winton Newman, FF.R.I.B.A., of 14, Gray's Inn-square, W.C., have been placed first in the competition organised by the St. Marylebone Borough Council for proposed tenement buildings. The designs submitted are on exhibition this week at St. Marylebone Town Hall.

Earby.

The premium of 20 guineas in the Earby War Memorial Competition has been awarded to Mr. Wm. A. Quarmby, Imperial Chambers, Grimshaw-street, Burnley.

Lockerbie.

As a result of correspondence between the Competitions Committee of the R.I.B.A. and the promoters, the conditions of the Lockerbie War Memorial Competition are now in order, and there is no objection to Members and Licentiates taking part.

Frodsham.

FOR THE WAR MEMORIAL COMMITTEE.—Designs for a war memorial. Sending-in day, October 30. (See our issue for October 1.)

Hyde.

FOR THE WAR MEMORIAL COMMITTEE.—Designs for a war memorial, to cost about £2,000. Sending-in day, October 21. Further particulars from Mr. James Diggle, Borough Surveyor, Town Hall, Hyde.

Liege.

The province and town of Liege invite designs from architects of Belgian and Allied nationalities for a war memorial. The cost of the monument, including any clearances of existing property on the site, is to be about 1,000,000 francs; and a sum of 100,000 francs has been allotted for premiums. The assessors will be MM. Rousseau and E. Rombaux and eight others to be nominated by the Fédération des Sociétés d'Architectes Belge, the Belgian Government, and the municipality of Liege. Sending-in day, December 1. Further particulars from Monsieur Léon Maréchal, Secretary de la Commission, Bureau des Beaux-Arts, Hotel de Ville, Liege.

Lille.

FOR THE MUNICIPALITY.—Designs for reconstructing and beautifying the city. Sending-in day, October 15.

Public House Competition.

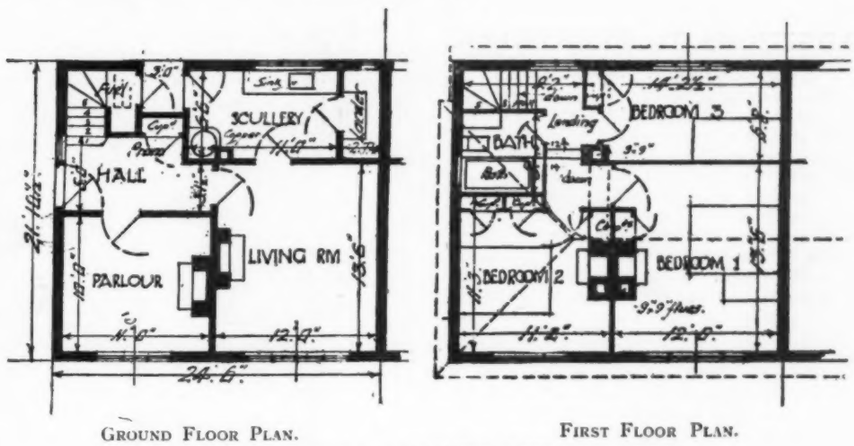
FOR THE WORSHIPFUL COMPANY OF BREWERS.—Designs for an improved public house. Further particulars may be obtained before October 21 from the Secretary of the Royal Institute of British Architects. Sending-in day, January 31, 1921. (See our issue for October 1.)

Gateshead.

FOR THE WAR MEMORIAL COMMITTEE.—Designs for a cenotaph in grey granite. Further particulars from Mr. George Gill, West-street, Gateshead.

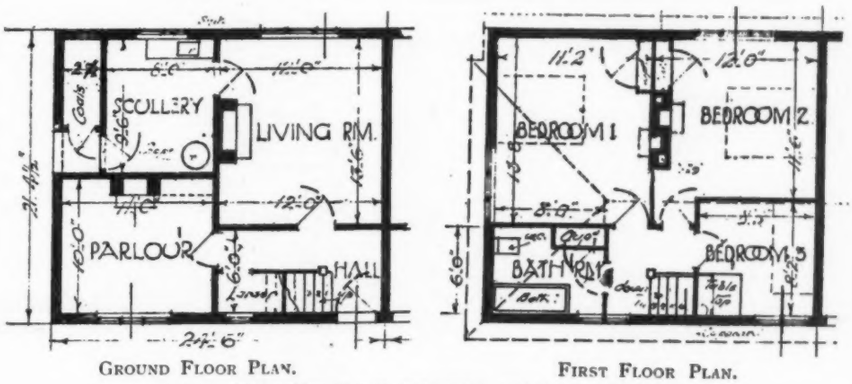
THE WARTBURG SEMINARY.

THE buildings illustrated on page 394 have been erected for the Evangelical Lutheran Synod, from the designs of Messrs. Perkins, Fellows & Hamilton, architects. The building is of stone, all of which was quarried within one thousand feet of the site. The stones visible from the outside are not applied as a facing, but extend right through the thickness of the walls. The tower is 88 ft. in height by 28 ft. square, and is divided into a basement and five stories, which are used as a chapel, music rooms, etc; the basement is used for the heating plant.



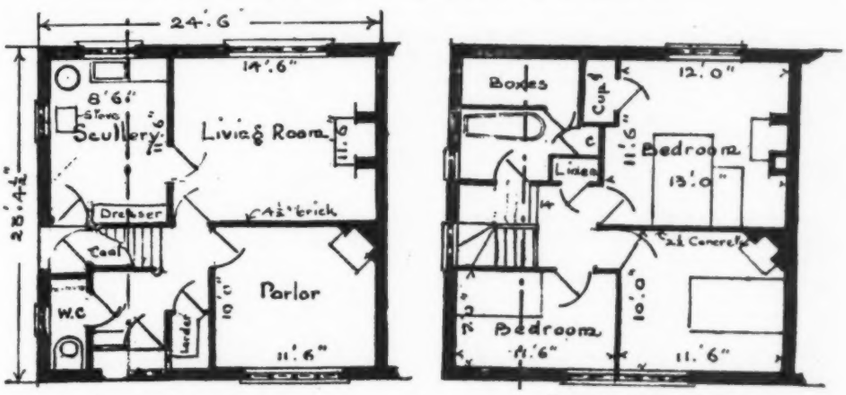
GROUND FLOOR PLAN. FIRST FLOOR PLAN.

PAIR OF TYPE "B" HOUSES, FOR S. ASPECT.



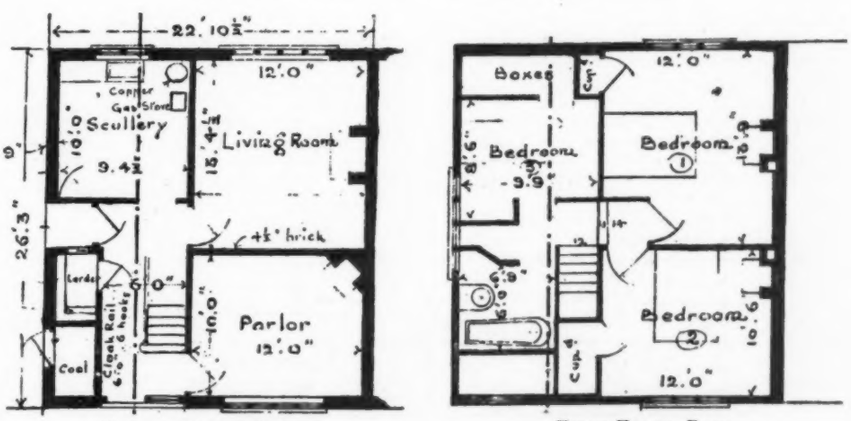
GROUND FLOOR PLAN. FIRST FLOOR PLAN.

PAIR OF TYPE "B" HOUSES, FOR N. ASPECT.



GROUND FLOOR PLAN. FIRST FLOOR PLAN.

PAIR OF TYPE "B" HOUSES, PLAN No. 1.



GROUND FLOOR PLAN. FIRST FLOOR PLAN.

PAIR OF TYPE "B" HOUSES, PLAN No. 2.

Slough Urban District Council Housing Scheme.

MR ALAN BROMLY, Architect and Surveyor to the Council. (*See page* 397).

ADDITIONS TO BRENTWOOD GRAMMAR SCHOOL.

We illustrate this week the accepted designs in the recent competition for additions to Sir Anthony Browne's School, Brentwood, by Messrs. Barker & Kirk, 11, Buckingham-st, W.C. The Memorial Hall has been planned to provide the required accommodation as economically as possible, accessibility from all the entrances to the existing buildings has been studied, one side is external, a class room at one end raised to a suitable level forms a stage when required, and a small retiring room is provided in close proximity. The "nave and aisle" arrangement of the Hall was adopted chiefly for economy, as it enables the north-west aisle to combine the functions of a gangway for the Hall and a corridor giving access to the new classrooms, and it also leaves two of the three subsidiary windows of the existing Chemical Laboratory open to the external air. The Hall piers are to be lined with glazed bricks, the remainder of the walls and ceiling are to be finished in plaster, and a scheme of decoration in plaster relief has been adopted, including the treatment of the gallery front as a war memorial. Space has been arranged under the stage classroom, accessible by a movable panel from the Hall, for the storage of chairs, scenery, and other properties.

The classrooms are all lighted from the left. For the walls of two of the classrooms it has been possible to utilise the existing foundations. The Physics Laboratory, on the first floor, provides accommodation for 30 scholars, and is comparatively handy to the existing Chemical Laboratory. A short Cloister has been arranged to provide an alternative approach to the stage classroom and an additional exit from the Hall. Externally the new additions are planned to conform to the existing work to which they are adjacent, and the extension is designed to form a consistent whole with the existing block of buildings.

The walls will be of brick, the external treatment of windows (with brick mullions, transomes, sills, heads and labels), gables and parapets conforming with the existing blocks. The floors throughout will be of fireproof ferro-concrete construction, finished with wood blocks on the surface. The roofs will be of timber construction on iron trusses and covered with tiles to match existing roofs. Flat roofs over one aisle of the Hall and Cloister and the central gutter between roofs will be of asphalte. The new work generally inside will be finished in plaster, with tile dadoes to classrooms, corridors and laboratory, the piers of the Hall and pilasters of aisle arches lined with salt glazed bricks continuing the treatment of existing corridors. The ceiling of the first floor classroom is partly in the roof, and those of the Hall and the Physics Laboratory are covered similarly to that of the Chemical Laboratory.

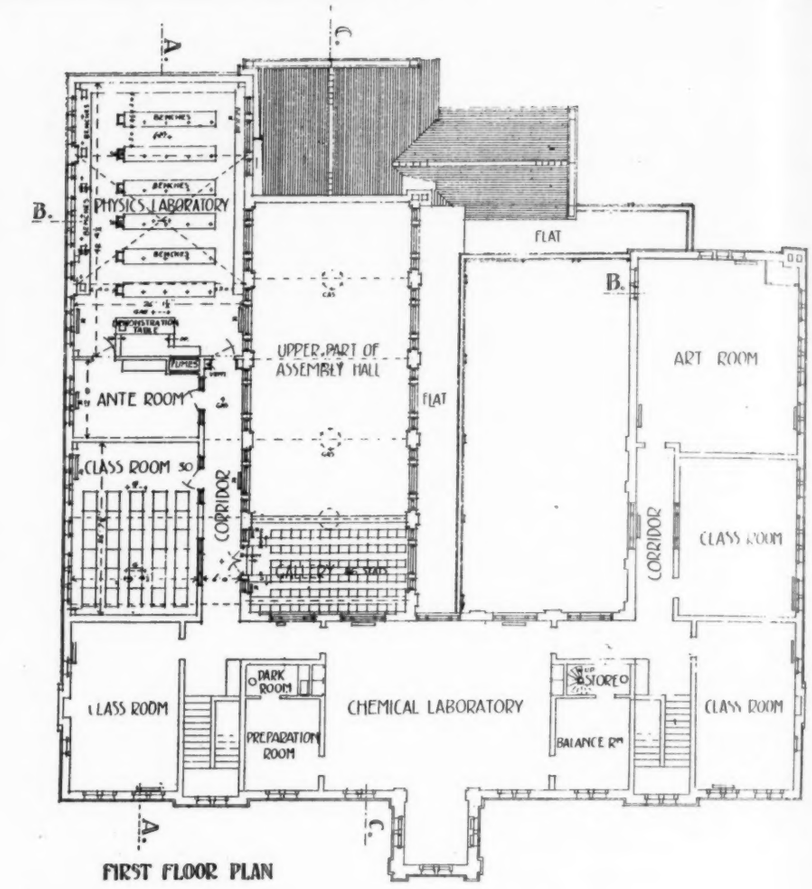
The new heating chamber has been placed under the stage retiring room, with a short basement passage connecting the new with the present heating chamber for the convenience of the engineer. Fresh air inlets have been provided in all rooms by air bricks in the external walls, discharging into the rooms either by air ducts or Tobin tubes at a 5 ft. level. Foul air exits to the ground floor classrooms are arranged close to ceiling level, leading into a foul air duct in the ceiling of the North West Aisle of the Hall.

On the upper floor and in the Hall, the foul air vents are in the ceiling. The foul air is drawn through these vents into sheet zinc ducts, into which the foul air from the ground floor rooms is connected, and discharged into the outer air through roof ventilators in the ridges of Hall and classroom wing roofs.

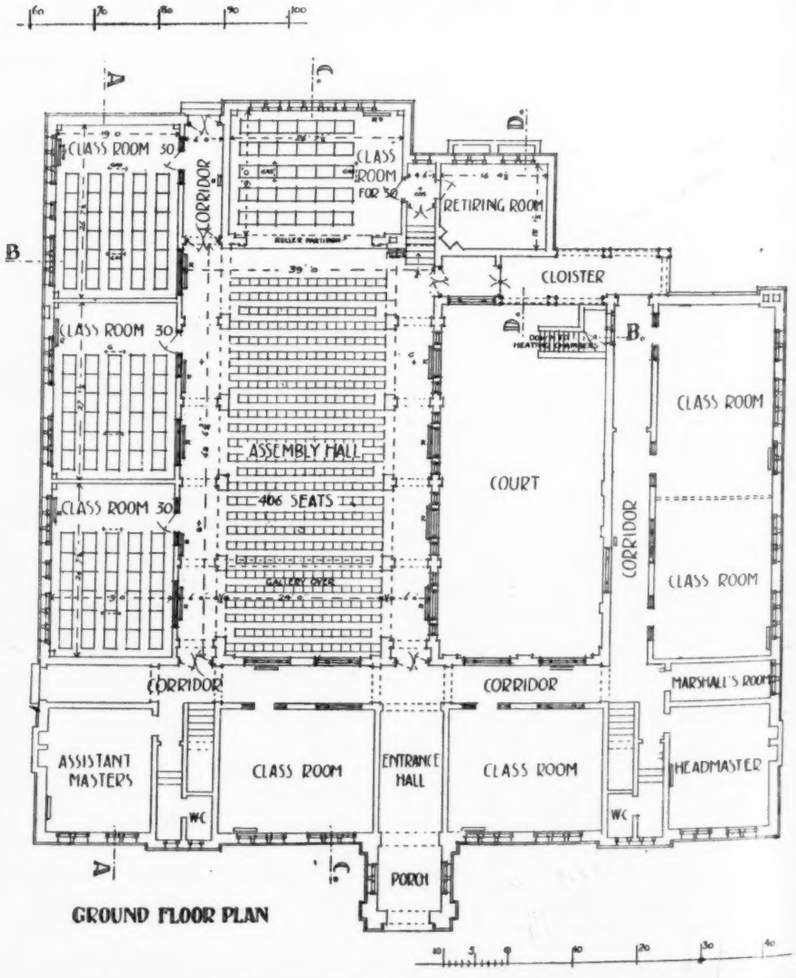
The total estimated cost of the new work is £18,673.

An Architect's Estate.

The late Mr. Albert Holmes Kirk, of Dewsbury, Yorks., architect, who designed several churches and other public buildings in the district, left estate of the gross value of £24,958.



FIRST FLOOR PLAN



GROUND FLOOR PLAN

Brentwood Grammar School Competition. Selected Design, by Messrs. Barker & Kirk.

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ILLUSTRATIONS

Entrance Porch, Beauvais.

The water-colour drawing of the entrance porch to the Chapter House, Beauvais, by the late Phené Spiers, is reproduced by permission of the Council of the Royal Institute of British Architects.

The Giralda Tower and Cathedral of Seville.

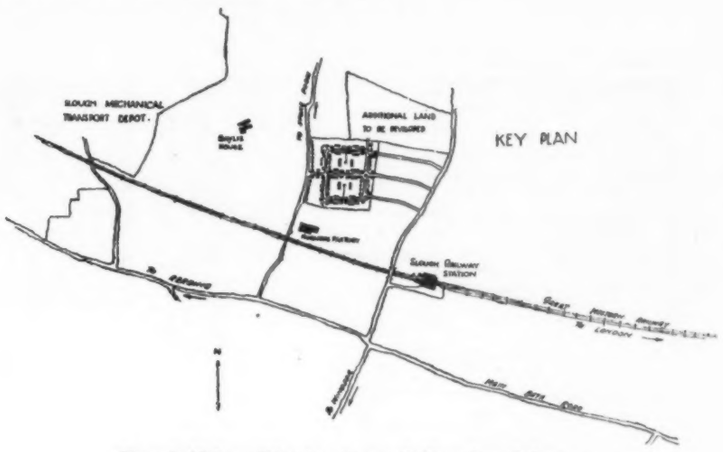
Born at Stockbridge, near Edinburgh, in 1796, David Roberts came to London in 1822, and was engaged as a scene painter at Drury-lane Theatre. He then turned his attention to architectural painting in oil, and had such success that in 1832-33 he made a tour in Spain, which he used to form the subject of many of his pictures. In 1853 he exhibited at the Royal Academy his "Cathedral of Burgos"; and the fine water-colour study of Seville Cathedral and the famous tower of the Giralda, kindly placed at our disposal by Mr. Selwyn Brinton, may very probably belong to this period.

War Memorial, St. Stephen's Church, Bournemouth.

The crucifix has been erected from the design of Mr. Paul Waterhouse in the beautiful garden which lies east of St. Stephen's Church. It is a position clearly visible from the adjoining roadway. The painted wooden figure is by Messrs. Martyn & Co., of Cheltenham; and the masonry and erection were carried out by Messrs. Maunell & Co., of Bournemouth. The wording of the inscription was composed by the architect. This monument bears some relation in appearance to the crucifix which Mr. Waterhouse designed for Holy Trinity, Winchester, a year or two ago, and still more to the memorial of the same type which he designed for St. Margaret's, Aberdeen, the position of which is particularly striking. Mr. Waterhouse does not greatly care for the rendering of this subject in stone, but a design by him for a stone crucifix is being completed at St. Swithin's, Bournemouth, for unveiling almost immediately.

Memorial for a High Road Site near the South Coast.

The road site crucifix was designed by Mr. Paul Waterhouse for a very exceptional position by the side of a main road leading to an important town, and its erection is, for the time being, postponed. The figure is in metal and the cross in teak.

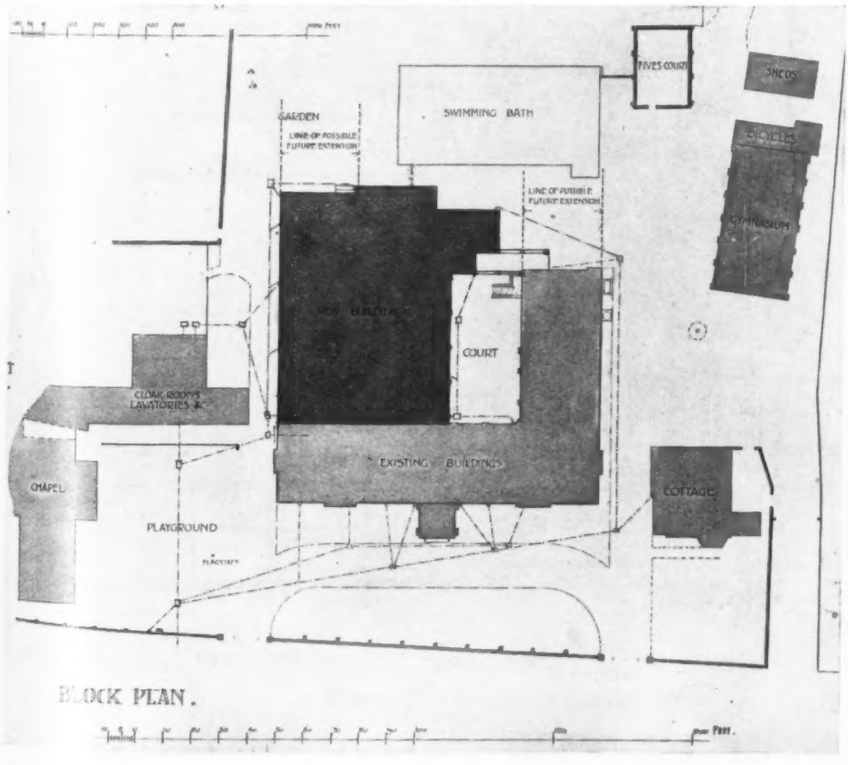


Slough Urban District Council Housing Scheme.
MR. ALAN BROMLY, Architect and Surveyor to the Council.

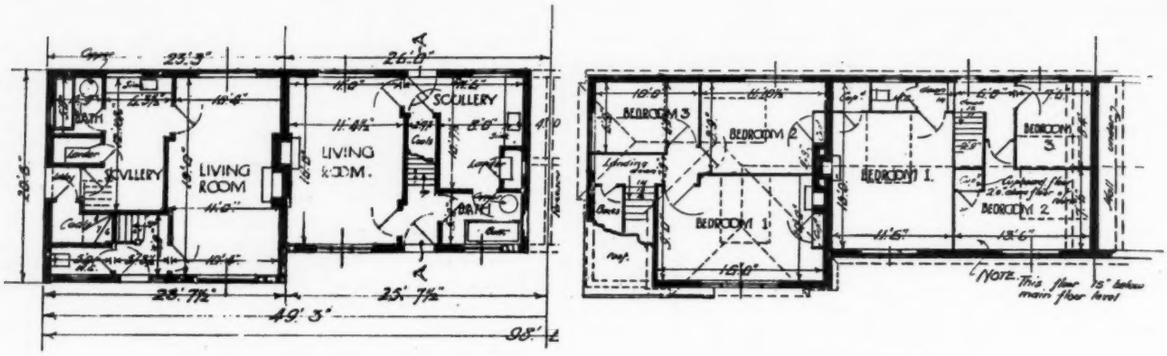
Slough Housing Scheme.

The need for additional housing accommodation in Slough was recognised by the Urban District Council some time ago, but owing to difficulties arising in connection with the purchase of a site the Council was unable to proceed with the preparation of a scheme. Negotiations were, however, sufficiently advanced to enable the Town Surveyor and Architect, Mr. Alan Bromly, P.A.S.I., A.M.I.C.E., to submit a lay-out plan to the Council for one-half of the land on February 27 last. Detail plans for lay-out, roads, sewers and the first thirty houses were adopted by the Council and approved by Mr. Elgood, the Housing Commissioner for the District, on March 18; and subsequently, with the assistance of Mr. R. B. Hamilton, A.R.I.B.A., plans for the remaining 212 houses were prepared, and the whole scheme approved by the Ministry of Health on May 4. By April 12, quantities had been prepared and prices agreed with the local Builders' Federation for the first thirty houses.

The lay-out of the twenty-five acres included in the part of the scheme illustrated in this issue provides for connecting up with three existing *culs-de-sac* and for access to the twenty-five acres of land remaining for future development; this has been prepared with a view to economical construction of roads and sewers and to suitable distribution of the houses. The principal roads will be tree-planted, and there will be four open spaces for children's playgrounds. The houses will stand 20 ft. to 30 ft. back from the road on plots with an average frontage of 30 ft. and a depth of 120 ft. The total number of houses now proposed is 242, composed of 89 pairs and 16 blocks of four, 194 with parlours, and 48 with large living-room and scullery only on the ground floor. Every house will have at least three bedrooms and a bath-room. Where the bath-room is downstairs, it will include a copper to permit of its use as a wash-house; and upstairs bath-rooms will be provided with a "Hurry" furnace for hot-water supply. It is estimated that the average cost per house, including proportionate cost of land, roads, sewers, drainage and fencing, will be about £1,000. Thirty houses of the "parlour" type are now in course of erection on the Stoke-lane frontage, *i.e.*, sixteen pairs of Plan No. 1 and fourteen pairs of Plan No. 2, at £886 8s. 5d. and £869 2s. 9d. per pair respectively. These prices were agreed with the local Builders' Federation in April last, and are subject to increases in wages and materials; but it is expected that the ultimate cost, including drainage, fencing, and paths, will be little over £1,000 per pair. The road and sewer work is being carried out by direct labour. Tenders are this week being invited for the 212 houses still to be erected under this scheme. The Council realises the probability of Slough becoming an important industrial centre, and new public offices, swimming baths and lavatories are to be built as soon as possible.

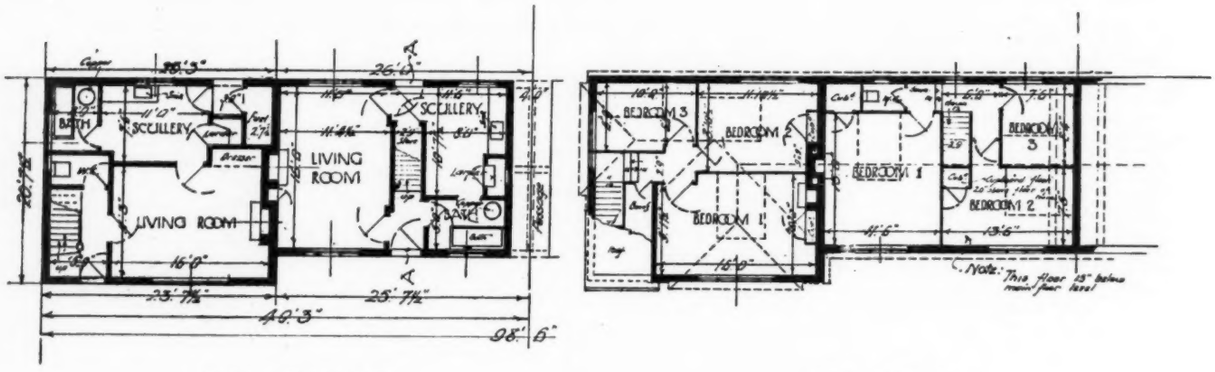


Brentwood School Competition.—Selected Design by MESSRS. BARKER & KIRK. (*See* p. 396



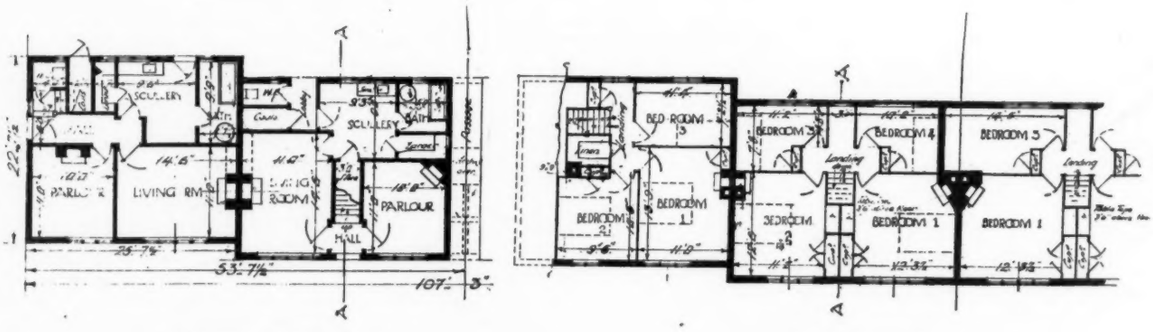
Ground Floor Plan. First Floor Plan.

BLOCK OF FOUR TYPE "A" HOUSES, FOR N. ASPECT.



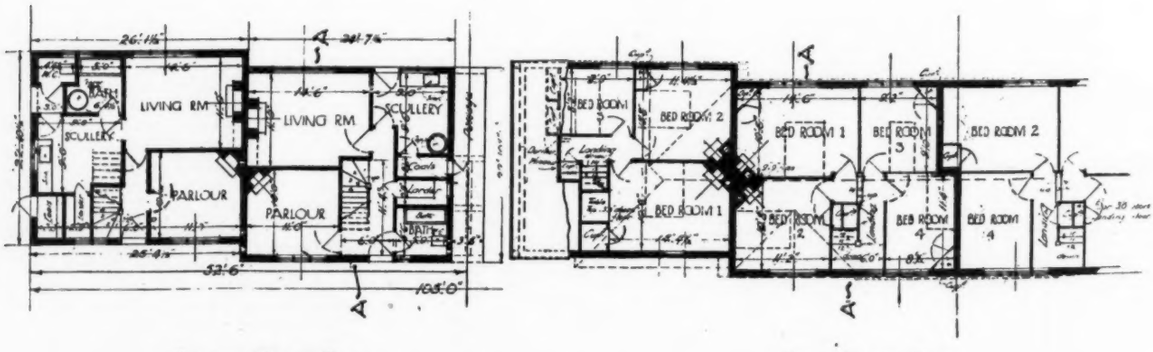
Ground Floor Plan. First Floor Plan.

BLOCK OF FOUR TYPE "A" HOUSES, FOR E., W. OR S. ASPECT.



Ground Floor Plan. First Floor Plan.

BLOCK OF FOUR TYPE "B" HOUSES, FOR S. ASPECT.

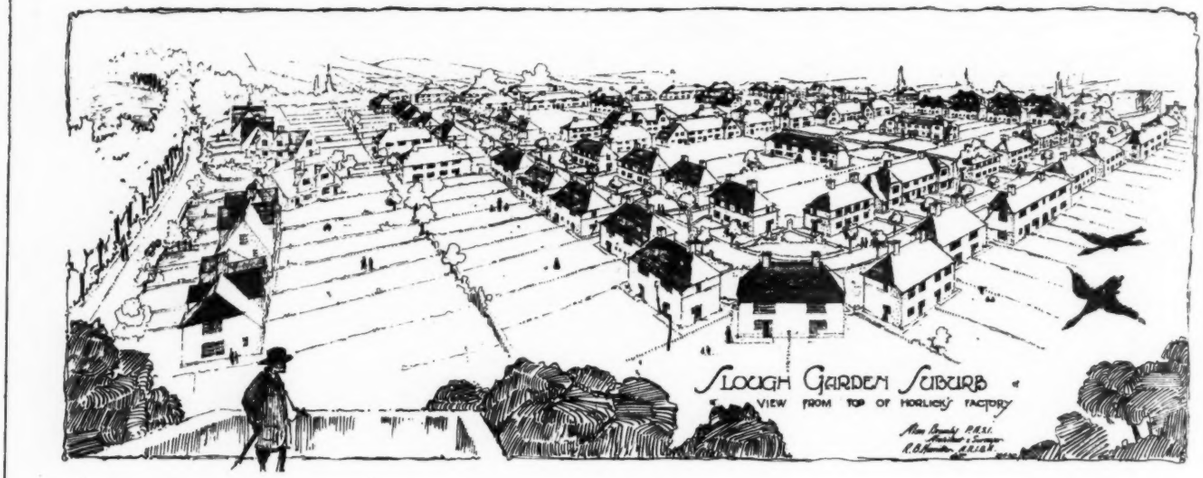


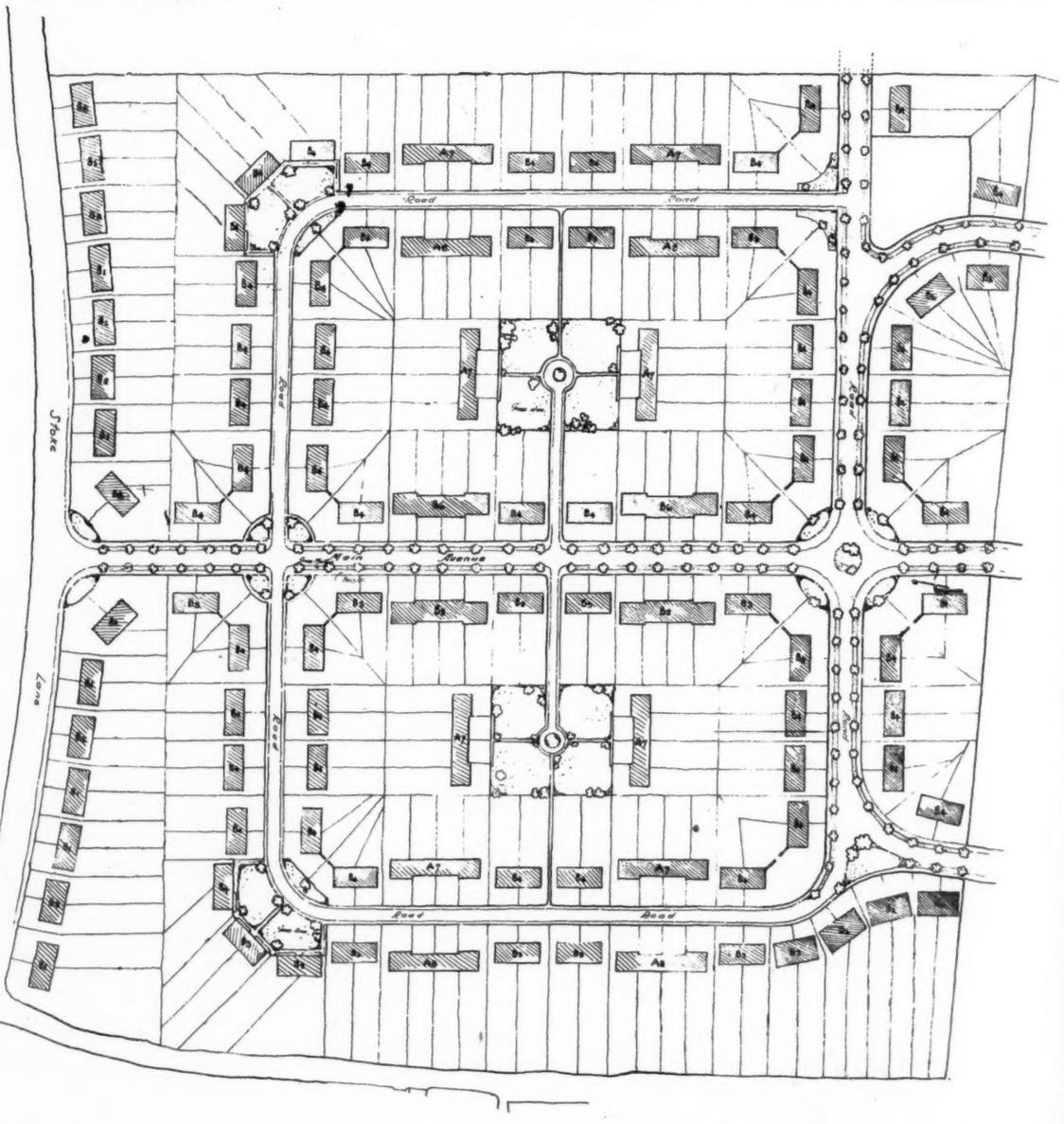
Ground Floor Plan. First Floor Plan.

BLOCK OF FOUR TYPE "B" HOUSES, FOR N. ASPECT.

Slough Urban District Council Housing Scheme.

Mr. Alan Bromly, Architect and Surveyor to the Council. (*See page* 397.)



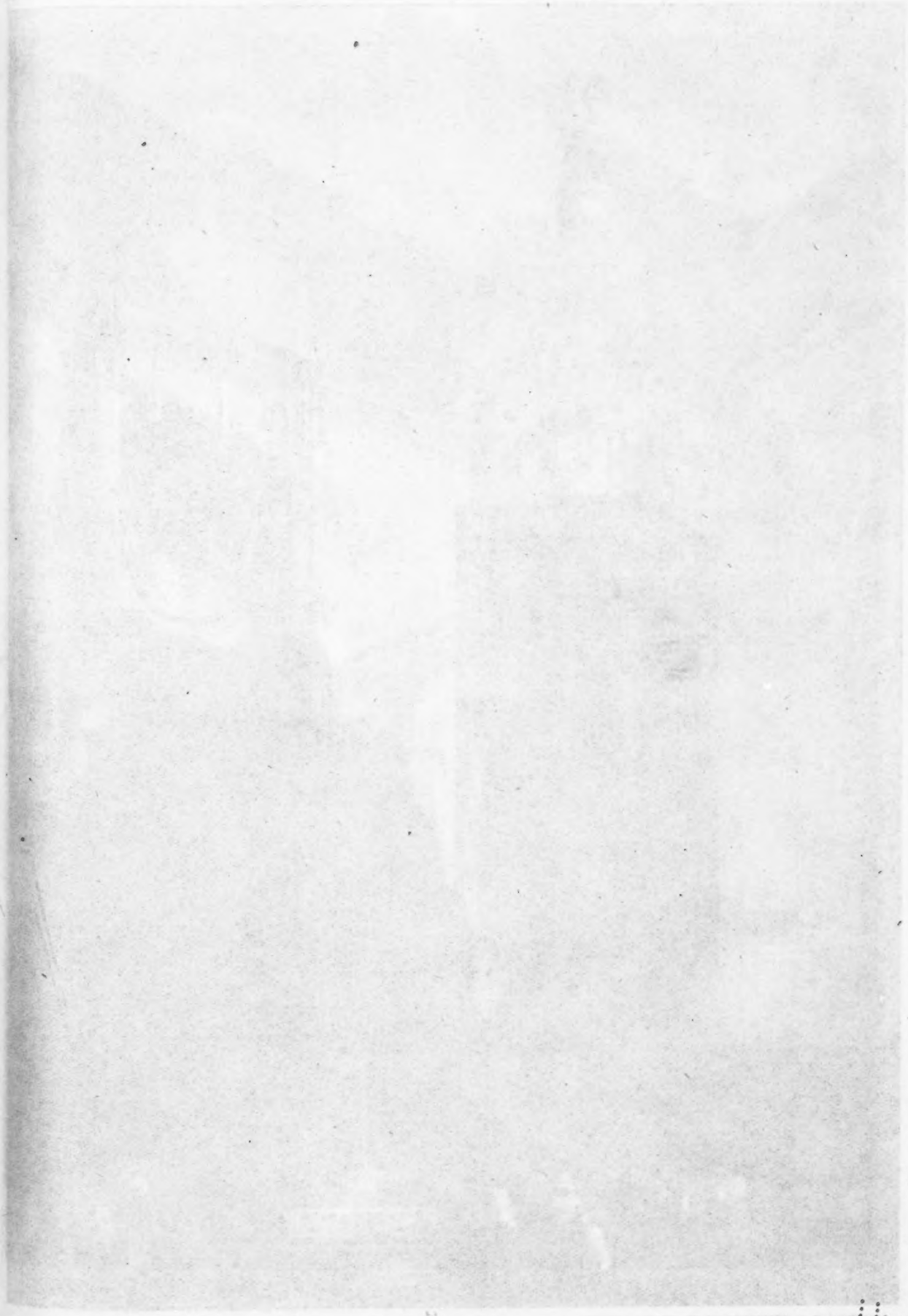


SLOUGH URBAN DISTRICT COUNCIL HOUSING SCHEME.

MR. ALAN BROMLY, ARCHITECT AND SURVEYOR TO THE COUNCIL.

WAR MEMORIAL AT ST. STEPHEN'S CHURCH, BOURNEMOUTH.

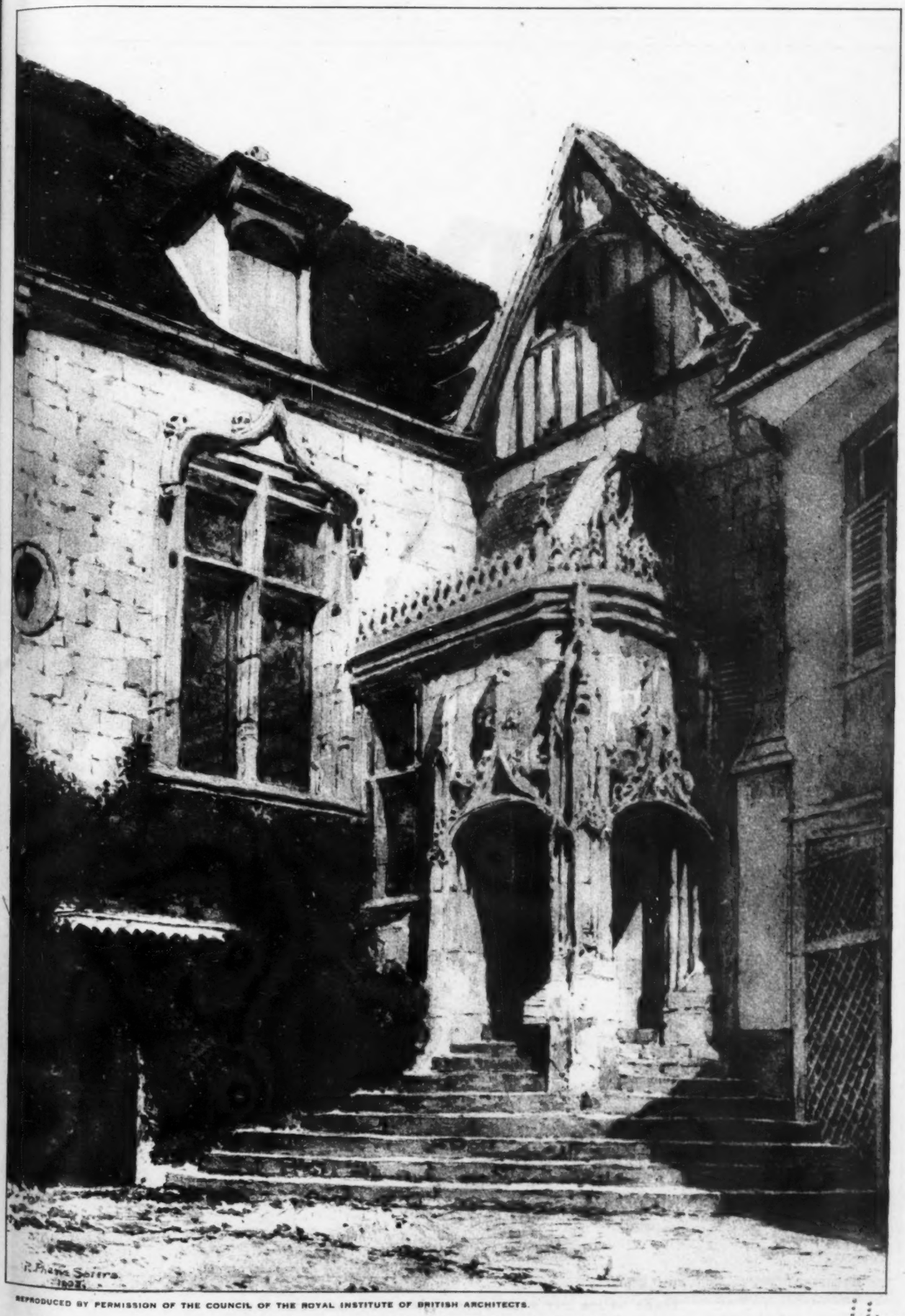
MR. PAUL WATERHOUSE, ARCHITECT.



REPRODUCED BY PERMISSION OF MR. SELWYN BRINTON.

THE GIRALDA TOWER AND CATHEDRAL OF SEVILLE.

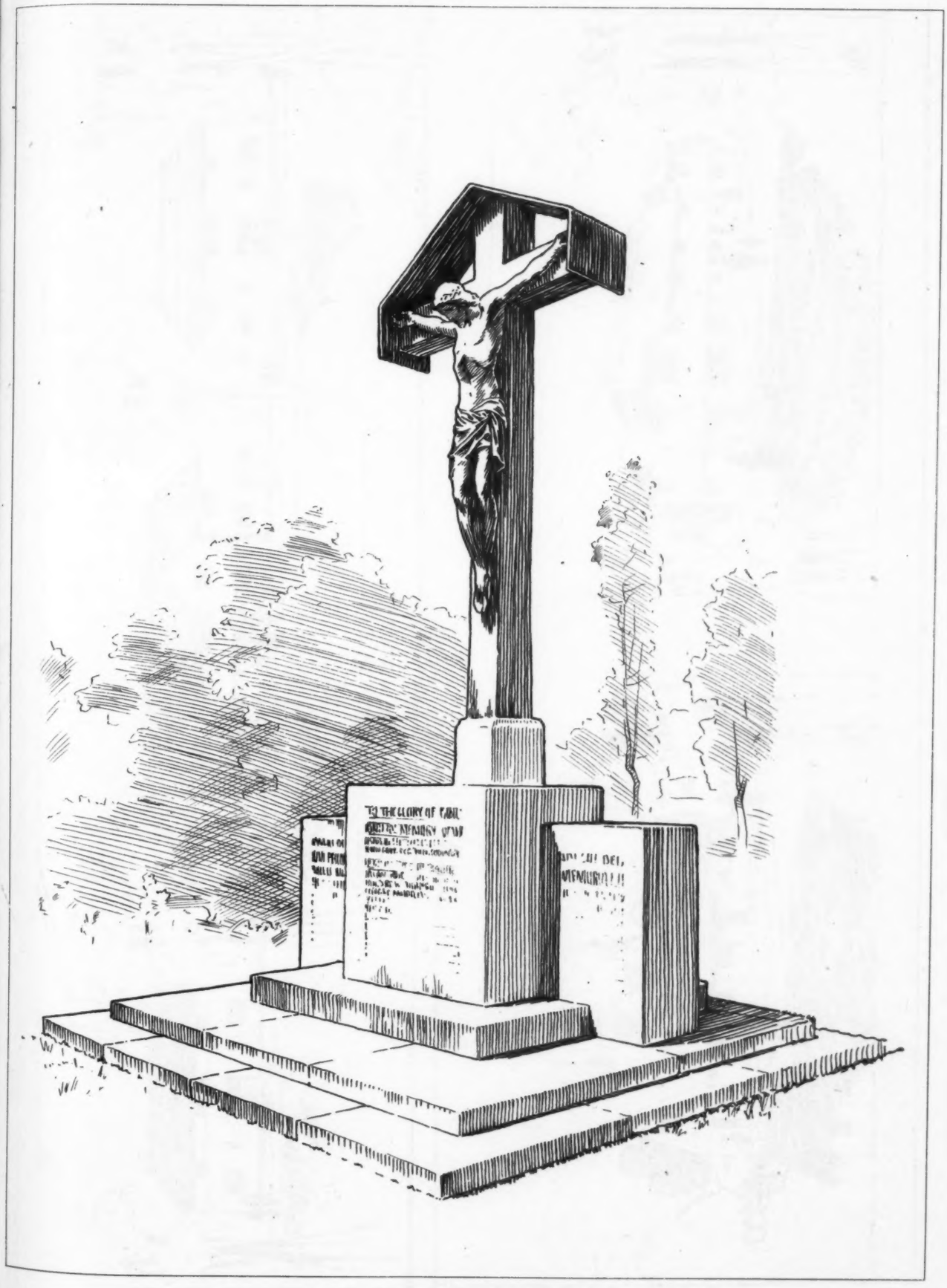
FROM A PAINTING BY DAVID ROBERTS, R.A.



REPRODUCED BY PERMISSION OF THE COUNCIL OF THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

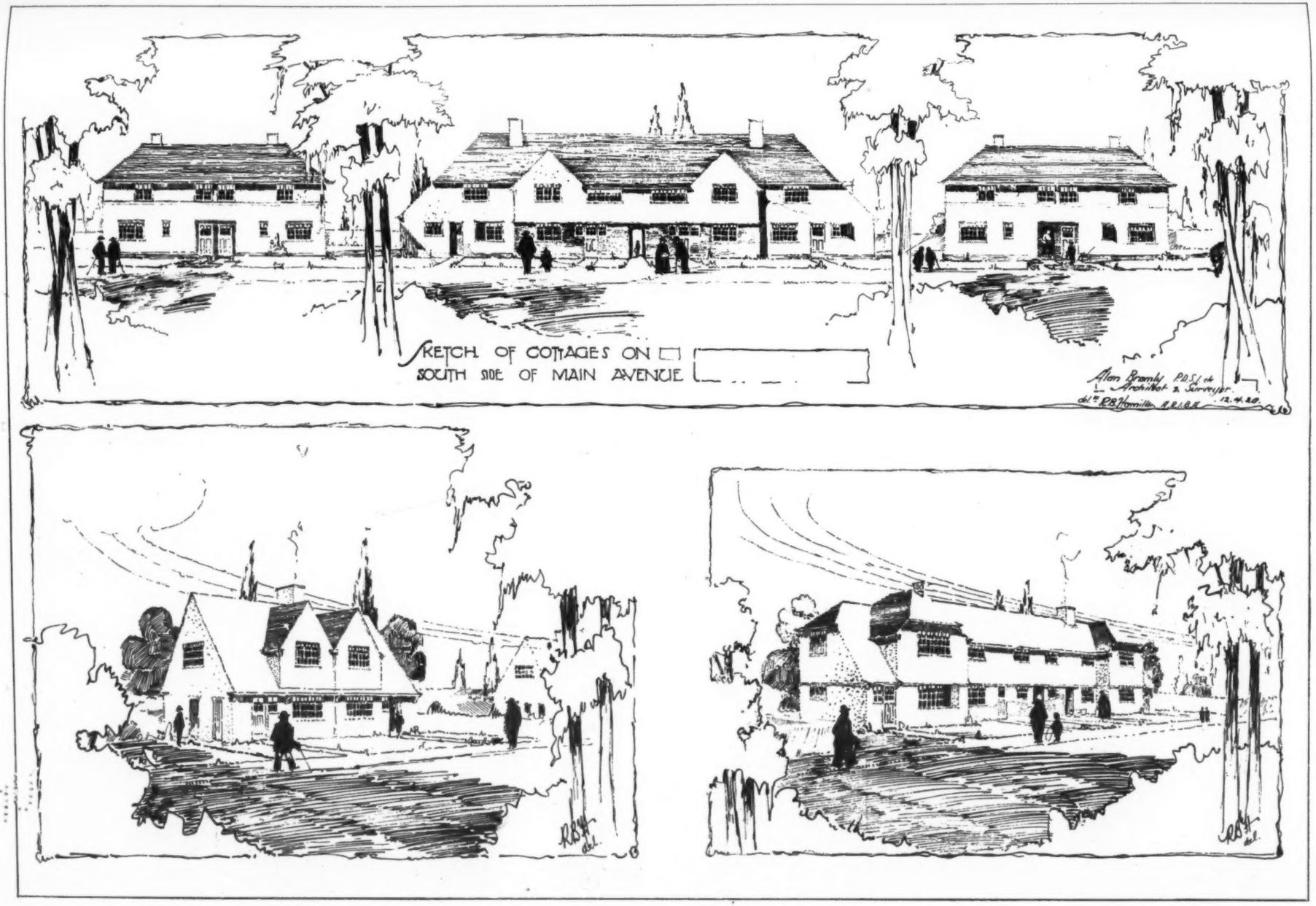
ENTRANCE PORCH TO THE CHAPTER HOUSE, BEAUVAIS.

FROM A WATER-COLOUR DRAWING BY THE LATE PHENÉ SPIERS.



WAR MEMORIAL FOR A HIGH ROAD NEAR THE SOUTH COAST.

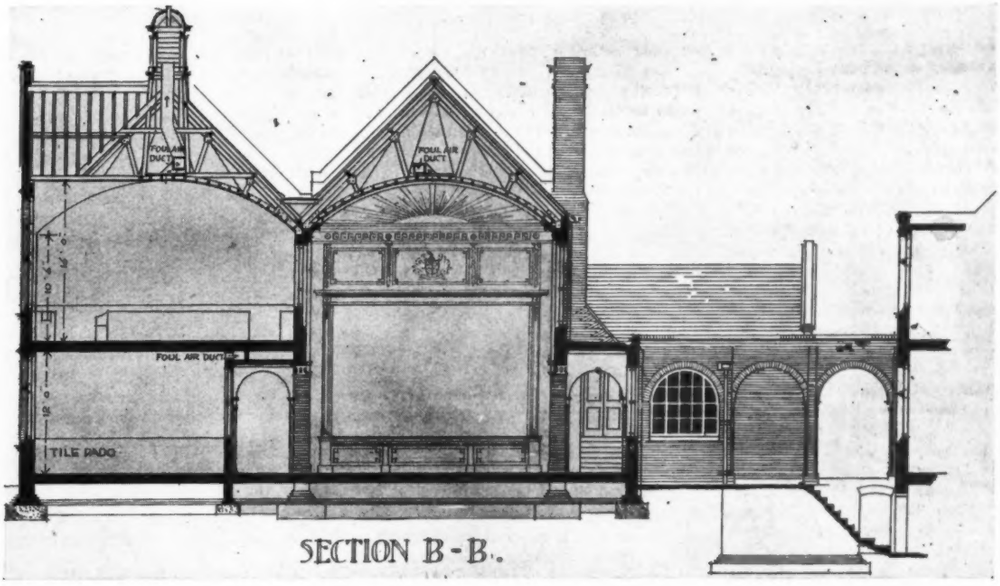
MR. PAUL WATERHOUSE, ARCHITECT.



SLOUGH URBAN DISTRICT COUNCIL HOUSING SCHEME.

MR. ALAN BROMLY, ARCHITECT AND SURVEYOR TO THE COUNCIL.

NORTH-WEST ELEVATION.



SECTION B-B.

NORTH EAST ELEVATION

Brentwood Grammar School Competition. Selected design, by MESSRS. BARKER & KIRK. (*See page* 396).

. . The . .

City Companies and Their Halls.*

No. 36.

The Gunmakers' Company.

MANY of the incorporations which date from the Stuart times were short-lived associations; they were more of the nature of an effort to obtain privileges and monopolies for a limited section than to promote genuine craft purposes, but the Gunmakers, who received a charter in 1637, and are thus among the youngest of the Companies, have pursued a career of usefulness since their inception. Up till that time, Gunmakers formed part of other organizations; in many of the English towns where the number and sub-divisions of Companies were less marked than in London, the Gunmakers remained part of another organization; while north of the Tweed they were included in the companies of Hammermen, who usually take first place among the Scottish misteries.

The Charter of the Gunmakers' Company was delivered to Henry Rowland, the King's gunmaker, and to sixty-two others, freemen of London, under the title of the Master, Wardens and Society of the Mistery of Gunmakers of the City of London, with the right of holding land in mortmain, electing officers, and powers of viewing, gauging, proving and marking of all hand guns, dags, pistols, barrels or locks, with a jurisdiction which extended over London and ten miles beyond it. In addition to the usual officers, there were to be two or more assistants to superintend the proof and trial of guns, while a special clause limited the powers of the Company in so far as they might be varied by any orders of the Privy Council or Council of War.

Every maker or finisher of guns, locks or barrels thereof intended for sale in London or within four miles thereof was to have his own private mark placed thereon before they were viewed and proved. Such private marks were to be first approved by the Company and an impression thereof made and entered upon the Company's Copper Plate in their common proving place. The powers of the Company as regards proof extended to arms which might be imported from foreign parts to be sold or put to sale in any of our dominions or foreign plantations, or to be there used for any form of recreation, before the same hand guns or any of them were sold or delivered.

The preamble of the Charter states that the Gunmakers in and about the City of London had for many years practised the manufacture of all sorts of hand-guns for the King's special service and supply of stores, as well as for the occasion of sports in the exercise and musters both for horse and foot, and that divers Blacksmiths and others not expert in the art of gun-making had taken upon themselves to make, try and prove guns after their own unskilful way whereby much harm and danger through such unskilfulness had happened, and that it was of great consequence to uphold the art of gun-making by reducing it into the hands of skilful artists alone, that might train up others in the art for the service of the King and his subjects, and that the Gunmakers of London were the most expert in the Kingdom in their art, and that it was desirable to make forms for the regulation and government of the art for the supply to the King's subjects of good and serviceable hand-guns for military service and otherwise.

The Charter also provided that no person should exercise the art of gun-making within the limits of the Charter who should not have served seven years' apprenticeship in the art and have first wrought his proof piece, produced the same to the Master and Wardens of the Company, and been approved as an able workman in the art.

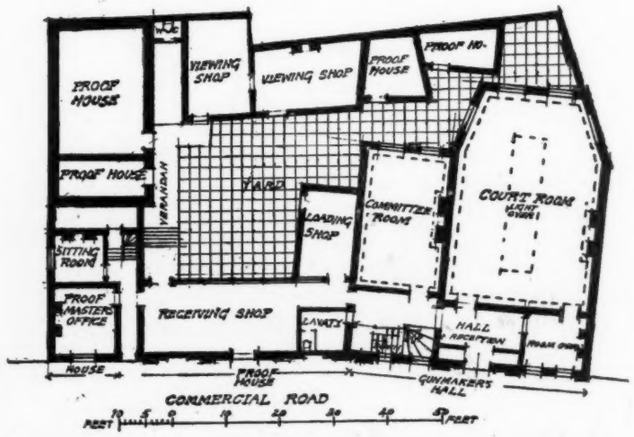
The Charter also provided that the Master and Wardens of the Company should have full power of search for view, proof and trial and marking of all manner of hand-guns whatsoever, great and small, dags and pistols, made in London and suburbs or within ten miles thereof, and of all such as should be imported from foreign parts or otherwise brought thither to be sold for military service or other employment in any of the King's dominions or foreign plantations or to be used for recreation, and to seize and take away and forfeit all such arms found not to be duly proved.

In olden times, East Smithfield, in the vicinity of the Tower of London and of the Gunmakers' premises, was a centre of the London gun trade, but now the trade has moved away and become dispersed.

The Gun Barrel Proof Act of 1868 recognized the Charter, but the Company's establishment is subject to the provisions of the Explosives Act of the 38 Vict., and in 1857 the Court of Common Pleas upheld the Company's right to stamp arms apart from any rights of the Birmingham Proof House.

The history of the Company is devoid of the romantic and historical associations connected with most of the misteries, and is that of a well-organized and managed commercial undertaking, doing much useful work and deriving the necessary income from the fees charged for

GUNMAKERS HALL: WHITECHAPEL.



* The following articles on the City Companies have already appeared in our pages:—the Mercers', March 31, 1916; the Grocers', April 28; the Drapers', May 12; the Goldsmiths', June 9; the Skinners', July 14; the Merchant Taylors', August 4; the Haberdashers', September 1; the Salters', October 6; the Ironmongers', October 27; the Vintners', December 8; the Clothworkers', December 22; the Barbers', January 26, 1917; the Dyers', Feb. 16; the Brewers', February 23; the Leathersellers', March 30; the Pewterers', April 20; the Cutlers', June 1; the Bakers', June 15; the Wax Chandlers', June 29; the Tallow Chandlers', August 10; the Butchers', September 7; the Armourers' and Brasiers', September 21; the Girdlers', October 12; the Sadlers', November 9; the Apothecaries', December 7; the Painter Stainers', January 11, 1918; the Curriers', February 15; the Innholders', March 29; the Coach and Harness Makers', August 16; the Founders', Nov. 15; the Stationers', December 13; the Coopers', Aug. 8, 1919; The Cordwainers', Nov. 14; the Carpenters' and the Joiners', Jan. 23, 1920.

testing and proving weapons. Probably the most interesting document connected with their history is the "Case of the Company of Gunmakers," which was issued as a broadsheet in 1710 and runs as follows:—

"The Case of the Company of Gunmakers.

"The said Company (tho' but Poor) have always Cheerfully and Readily Served Her Majesty to the utmost of their Power, and there is now due to the said Company from the Office of the Ordnance about Thirty Thousand Pounds.

"The said Company not being able to give further Credit did humbly represent to the Office of the Ordnance, That in case they would be Paid, or have but Money to go on with their Work, they would be able to Supply the Government with Thirty Thousand Arms every Six Months if required.

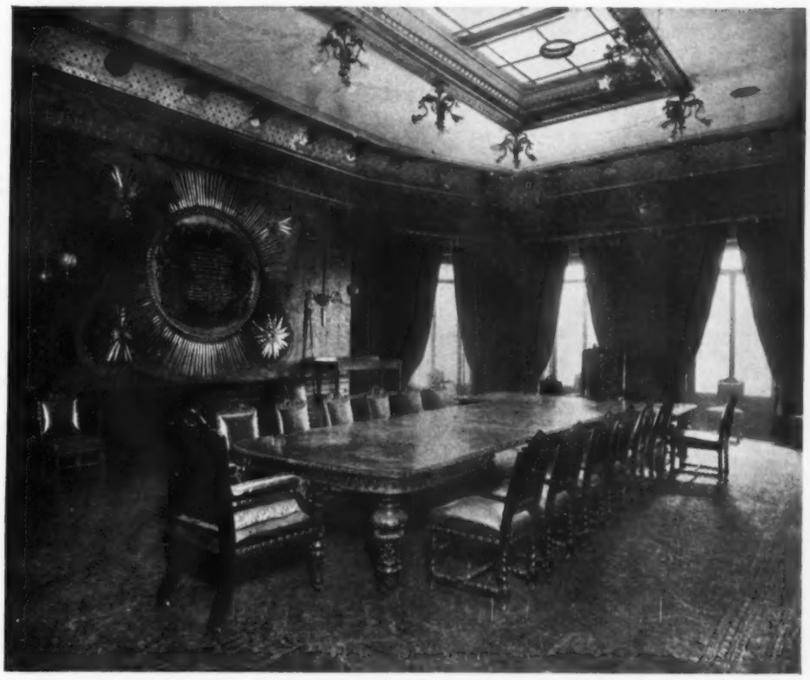
"Tho' the said Company could not obtain their just and reasonable Request, yet Ten Thousand Arms were Bought in Holland, for the Expedition under the Earl Rivers and Money remitted to them; which would have enabled the said Company to have Suppli'd Her Majesty, whom they have always so readily Serv'd. And there are now bespoken in Holland, Ten Thousand Arms more for the Stores in Ireland.

"By this Encouragement to Foreigners, the Trade of Gun Making will be Improv'd abroad, and entirely Lost here; and great Sums must be Exported to Pay for the same, which otherwise would Circulate at Home; and the said Company, and Thousands employed by them, must be utterly Ruin'd for want of Wage, and many are so already.

"That in case there should be (which God forbid) a Sudden Occasion for Arms at Home, it will be too late to get Work-Men, when they have gotten into some other Employment, for the maintaining Themselves and Families (as many have done already) or Set up their Trade in Foreign Countries, where they meet with Encouragement.

"All which is humbly submitted to your Honours and is Prayed by the Said Company. That their hard case may be considered; and that so useful a manufacture may not be lost in England.

"Anno 1710."



The Court Room, Gunmakers' Hall.

The Incorporation of the Company was viewed with disfavour by the City authorities and by the

Armourers and Blacksmiths, and it was not until 1656 that it was finally enrolled, largely through the good offices of one William Smith, who used his influence with the Court of Aldermen and was subsequently made Clerk at a salary of £8 a year. The Company made efforts in 1680 to obtain the passage of a Bill to prevent the importation of foreign arms into the kingdom, in which they were, however, unsuccessful. The Birmingham Proof House was established in the reign of George III, and both the London and Birmingham Companies promoted the Gun Barrel Act of 1855, while the powers granted were supplemented by a further Charter in 1892.

The proof mark is "G.P." regally crowned, which signifies Gunmakers' Proof, to which a "V" is now added, which signifies Viewed, and these marks have long been recognised as a guarantee of excellence and good workmanship.

The Arms of the Company, which are described by Edmondson as appearing to be the composition of a painter and not a regular armorial grant, are thus described :—

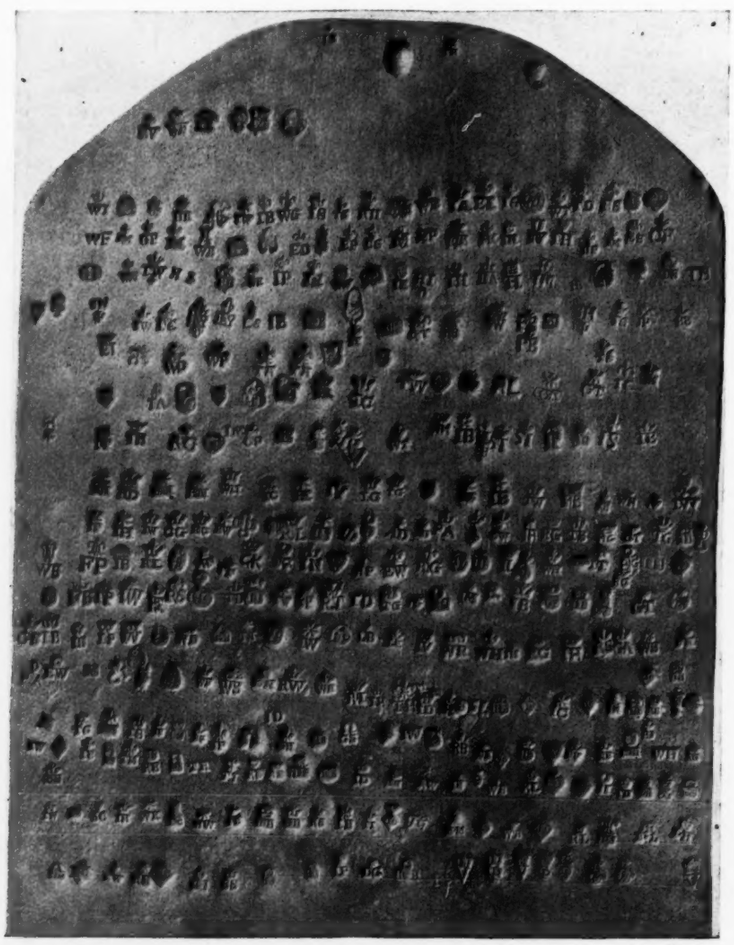
Arms.—Two guns in saltire proper, in chief the letter G, in base the letter V sable, each crowned with a regal crown, on the dexter side in fesse a barrel and on the sinister three balls all of the second. *Crest.*—A dexter arm embowed, vested with steel armour garnished or, the hand holding a scimiter, all proper.

Shortly after the grant of the Charter the Company erected a Proof House in Goodman's Fields, Whitechapel, near the Tower of London, but the oldest part of the present structure—the Proof House—only dates from 1826. It forms 48, Commercial-road, Whitechapel, and the adjoining Hall, which was erected in 1872, is the only hall of a City Company without the bounds of the City of London. It consists of a Court and Committee Room on the ground floor with a drawing-room over in close connection with the Proof House, previously mentioned. The Court Room is a large, top-lighted room terminating in a bowed end, and on one of its walls is a handsome trophy of arms presented by a Past Master. The Receiving Room, Proof Master's House and Office and Proof Houses occupy three sides of a square, the fourth side of which is formed by the Company's Hall.

The Company, unlike most of the earlier Associations, owns no property other than the site of its present premises Its income, being derived solely from charges made for the proof of guns, has varied greatly; but, in common with like bodies, it has contributed considerable sums for the furtherance of technical education and other public objects.

The Victoria and Albert Museum.

A number of interesting pieces of English furniture have recently been added to the collections at the Victoria and Albert Museum and are exhibited in the Galleries of the Department of Woodwork. These include an English side-table with marble top of the date 1730–1740, of walnut wood enriched with carving of the finest quality—a distinguished piece belonging to a type hitherto unrepresented in the Museum (Room 58); an English armchair of the first half of the sixteenth century, carved with linen-fold panels and ornament of the Renaissance style (Room 52); a pair of richly-carved chairs of the Queen Anne period (Room 58); the Powell Collection of Dolls and Dolls' Furniture (Room 57), presented by Mr. Harry J. Powell, consisting of numerous costume dolls dressed by members of the donor's family between 1754 and 1853, with an interesting collection of models of contemporary furniture and specimens of Leeds pottery.



The Gunmakers' Proof Plate.

BOOKS.

Lectures on Industrial Administration. By B. Muscio, M.A. London: Pitman & Sons. 1920. Price 6s. net.

Works on industrial problems are becoming more numerous, but this new field is by no means yet filled. The present volume of 276 pages comprises a collection of lectures delivered at Cambridge by a number of authorities on this subject, under the direction of Professor C. S. Myers, Director of Psychology. The first deals with the ethics of industry, and though the author apologises for the platitudinous nature of his subject, he brings out the dignity of labour and, while admitting that the piece-meal nature of present factory work cannot admit of the old pride of craftsmanship, he makes a good point in comparing the pride of the factory to that of a regiment. The second lecture makes a plea for a science of industrial administration, gives an historical review of the growth of industry and lays stress on the need for specialisation and real training for management. Next we have a review of the trend of modern industry, opening with the shop steward movement. In dealing with the principles of British management the author attributes much unrest to fear of unemployment and points out that this fear may best be dispelled by increasing export trade. We have often had occasion to tell the British workman that in these days his value must be judged on a world standard, and there is much worth reflecting upon in these pages. Section 5 deals with vocational training, and points out the variety of types of humanity, and how badly we select persons for responsible positions. The methods of selection and classification used in the American army during the war are suggested for industrial purposes. Chapters follow on successful advertising and on social psychology. Then we have a lecture on overstrain and its results. Women in industry receive a special chapter while to industrial welfare and health a good many pages are devoted. Lastly we have a chapter on the important subject of industrial research, with a concluding lecture on statistical measurement of the human factor. Those responsible for our industries will find much in this book worth careful thought, and its price should bring it within the range of everyone interested in this subject. We have no wish to be organised to the stage of losing our individuality, but there is no doubt that much wasted effort and unhappiness result from our present haphazard system, which this book should do something to improve.

Calculating Diagrams for Design of Reinforced Concrete Sections. By James Williamson, A.M.Inst.C.E. London: Constable & Co. Price 12s. net.

The author has evidently had much work in the design of concrete structures, and consequently frequently has to solve certain equations. Everyone under these circumstances sooner or later will make an effort to avoid the fatigue of the mechanical work of computation and at the same time endeavour if possible to reduce the risk of error. Formerly, computers put their results into tabular form; to-day, however, many prefer curves, for it is then possible to construct diagrams geometrically, giving an increased amount of information together with greater accuracy with expenditure of less labour. The author has constructed 17 diagrams dealing with various problems arising out of the design of reinforced beams, pillars, stirrups and inclined shear rods. Each diagram is accompanied by explanatory examples of its use, and thus may be easily applied by any ordinary computer. Draughtsmen and others should find these diagrams, which are very clearly drawn, extremely valuable in their work, and they will also indicate the lines along which other diagrams might be designed to meet any special need in particular specialities.

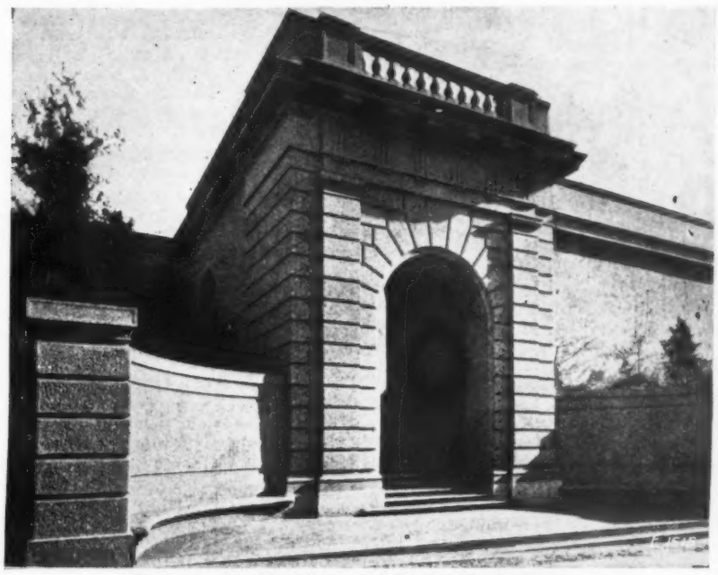
SURFACE-TREATED CONCRETE AND STUCCO.

THE following is an abstract of an address by Mr. J. C. Pearson (U.S. Bureau of Standards) and Mr. J. J. Earley (a sculptor, of Washington), read at the recent National Conference on Concrete House Construction, at Chicago:—

Studies of the experimental stucco panels at the Bureau of Standards led to the general conclusion that by adherence to well-established practice structurally sound and durable stucco could be secured, but that a great deal could be, or ought to be, done to improve its appearance. Crazing and map cracking is common to most stuccos, and are especially objectionable on surfaces of fine texture. The monotony of the cold grey cement colour is objectionable, and is only partially relieved by the use of white cement and mortar colours. Finally, the muddy appearance (due to cement, or cement and pigment, being too much in evidence) is objectionable from an artistic standpoint. Consideration of these matters suggested at once the use of much less cement, and it became evident that by efforts in this direction improvement in appearance might be obtained. The apparently insurmountable obstacle to this departure from usual practice was, of course, the lack of plasticity in the leaner mixtures. Various methods of overcoming this difficulty were considered, and some experiments were made which indicated that a real improvement might be obtained by substituting fine inert material for a portion of the cement. The easiest way to accomplish this result seemed to be by using blended cements—that is, normal cements ground with a certain percentage of sand, stone-screenings, or other materials. These experiments were never carried very far, however, for it did not seem possible that any method which might be devised for retaining plasticity could bring about the desired result, namely, the elimination of all objectionable features.

Serious as was this lack of plasticity in the lean stucco mixtures, it was, after all, something that could be overcome. This was demonstrated by the fact that mixtures as lean as one part cement to six parts of stone screenings were applied on some of the Bureau of Standards panels, with excellent results. But the improvement in these panels as compared with some of the easier working combinations did not seem great enough to justify the increased cost of application. The question finally arose whether by careful attention to gradation of the aggregates this improvement in appearance might not be so enhanced that the cost would be a secondary consideration. This idea came from the fact that Mr. Earley had succeeded in making complicated casts of concrete from specially graded aggregates in such manner that a very large percentage of the area of the treated surface (first wire brushed and then washed) was aggregate, and a very small percentage cement. Possibly due in part to the higher reflecting power of the surfaces of the exposed aggregates, the colour of the concrete surfaces thus produced was determined almost wholly by the colour of the aggregates, and only very slightly affected by the cement itself. A most convincing demonstration of this fact was obtained by constructing two concrete slabs containing exactly the same proportions of specially graded aggregate, the one being mixed with grey cement, the other with white cement. After the surface treatment of brushing and washing had been applied, only an expert could have determined which slab contained the grey cement and which the white.

Before colour in concrete surfaces can be under artistic control, a technique must be developed which has for its medium the elements of the concrete itself. Although in problems involving appearance aggregate is by reason of its greater bulk the major element and cement the minor, it is, nevertheless, the colour of the cement which is the natural colour of normal concrete. If, therefore, concrete is to receive its colour from the cement paste, variation must be obtained by the addition of pigments to the cement; but if the aggregate is to be the source of colour, the concrete must be so designed and manipulated as to include the greatest possible amount of aggregate. Any great degree of success can hardly be expected in colouring concrete through the cement. The choice of colours is restricted by chemical reaction with



Entrance to Meridian Hill Park, Washington.

Entrance to Meridian Hill Park, Washington—Detail.

Interior View of Cafe, Washington.

the cement which causes them to fade or change; depth of colour is restricted by strength requirements of the concrete, which limits very closely the amount of pigment which may be added to the cement. Therefore, with the choice of colour limited by one requirement and the depth of colour by another, the cement itself must remain dominant. On the other hand, in colouring concrete through the aggregate all such restrictions are removed, and colours may be obtained from white to black, through all the range of possible aggregates. It is obvious that, if the aggregates are carefully selected and carefully placed, all the elements are present for the successful colouring of concrete surfaces. From the results obtained in practice, there is every reason to believe that the aggregate is the proper source of colour for concrete. Hence it was a most important conception that a similar result might be obtained with stucco. The success of this depended, first, upon securing a suitable gradation of the stucco aggregate; and second, upon being able to apply such a mixture, once it were satisfactorily compounded. It was known at the outset that these mixtures would be harsh, therefore plasticity no longer played any part in the calculations.

In the laboratory experiments, the sizes of cement particles, sand particles and coarse aggregate particles were reduced from the normal sizes in the ratio of about 1 : 10, this being taken as the approximate ratio of the size of particles passing a No. 8 sieve to pebbles 1 in. in diameter. It was assumed that the density of such mixes would depend mainly on relative sizes of the component particles, with due allowance for the water content. If these mixes appeared to be satisfactory for the purpose, it was assumed that any reduction within the 1 : 10 ratio would also be satisfactory, and the actual reduction to be employed in compounding any given stucco mixture of this type would be as slight as the requirements of texture and the difficulties of application would permit. These experiments with the miniature concretes were very successful.

The first attempt to apply the new product to a vertical wall was not wholly discouraging. Small areas were treated successfully, and eventually a portion of one of the new laboratories of the Bureau of Standards was coated with the exposed aggregate stucco. This example, while it is not as free from imperfections as the more recent work, has attracted most favourable notice. New requirements in thoroughness of mixing, consistency and control of the absorption of the undercoats were met, and other improvements in the general process were gradually introduced.

The writers believe that the experiments show progress in the development of concrete and stucco as materials worthy of a place in the highest type of buildings or structures. None of this work is an imitation of stone. Close inspection shows that it is concrete, with textures that vary widely, but always characteristic of concrete. Furthermore, the material may be cast in any form the architect may desire, with all details complete; no cutting, tooling or dressing is required other than the prescribed treatment of cleanly exposing the aggregate. Finally, the material provides a medium for the expression of colour in infinitely greater variety than that which obtains in the natural building stones.

The new type of exposed aggregate finish cannot fail to arouse new interest in stucco, as a product, regardless of the nature and treatment of the finishing coat. The product should be more widely used, and the reason it is not more widely used is that it has too often been applied by contractors or mechanics who consider it only as an outside plaster. Cement stucco is more like concrete than plaster, and plasticity is not essential. The art of applying durable stucco is very different from the art of plastering, and stucco will take the place it deserves among building products only when this fact is generally recognised.

The illustrations show some of the work carried out by Mr. Earley in the vicinity of Washington.

ELECTRICITY IN SMALL HOUSES.—II.

WIRING—(*Concluded*).

MUCH can be done to simplify the installation in other ways, besides adopting a cheap method of wiring. A main switch is not necessary for a five-light job, taking, say 200 watts, double-pole fuses meeting all requirements. The switches need not be fixed at hand level; they are better mounted near the ceiling, and operated with a cord, or they may still more economically be combined with a ceiling rose. Where a rental system is in force it is necessary to adopt means to ensure that the lamps are not exchanged for others of higher consumption; this can be done either by using a special type of bayonet lamp-holder, as is done by the Fixed-Price Light Co., or by using Edison screw-cap lamps and holders, a method which has been found quite satisfactory, as these lamps, though standard on the Continent, cannot be obtained here in small quantities. It is advisable also to provide for free renewal of lamps, thus keeping control over the type and size of lamps used; of course, lamps which are broken and not burnt out are not renewed gratis. Actual experience has shown that houses supplied on these lines with electric light not only afford a good return, but are, in fact, a highly profitable class of customer to the supply authority. The cost of installation per point can be kept down to 20s., even in these days, and the cost of maintenance is trifling.

A method of installing electric light which deserves serious attention in this connection, but is not widely known, is the condenser system; this is applicable only to lighting, and its use is possible only where the supply current is alternating, but these conditions are present in a great many cases. On this system the lamps are wired in series, a single wire being run round the house and feeding all the lamps. At some point in the circuit (preferably at the point of entry) a small condenser is interposed, a device which has no moving parts and costs about half as much as a meter; the condenser limits the current that can be taken to a fixed value, no matter how many lamps are switched on, and the energy loss in it is negligibly small. All the lamps take the same current, but their voltage varies according to their candle-power, and it is important to note that if desired high-efficiency gas-filled lamps, which take little more than half a watt per candle-power, can be used with advantage in small sizes. The switches are arranged to short-circuit the lamps when not in use, and may, of course, be of the switch-holder type. When more lamps are switched on than the authorised number, the light grows dim, thus calling attention to the fact. Short circuits on the wiring with this system are quite harmless, and the use of a single wire cheapens the cost of installation considerably. From the supply authority's point of view, the system is highly desirable, as the condensers help to raise the power factor of the general load on the mains. The condenser system has been in use for some seven years for lighting small houses, with very satisfactory results. A complete installation, including the condenser, seven lamps and shades, can be put in at a cost of £10 10s., and this might be reduced somewhat; an installation in screwed tube, with high-class cables, seven lamps and shades, would cost more than twice as much, without a meter.

It should be observed that labour costs form a large proportion of the total cost of installation, and therefore, in connection with the new housing schemes, many of which include the fitting of the houses for electric lighting, it is important that the houses should be dealt with as far as possible in bulk, so to speak; all materials should be standardised, and transported to the site in quantity, and the wiring of the houses should be organised so as to economise labour to the utmost.

Co-operation between the architect, builder and wiring contractor is of great importance in connection with a block of houses all built to the same plans, and all being built at the same time. In such a case, the best arrangement of the lighting points and switches should be settled beforehand in consultation; at the same time the system of wiring to be used should be decided. Then, instead of the wiring contractor being called in to cut the walls about after they have been finished by the builder, the latter will leave passage ways for the wires, build in fixing blocks where necessary, and give notice to the wireman at the right time for him to come in and do his part with the minimum of cutting away and making good, which ordinarily costs one-third of the whole cost of labour on an installation.

It is worth noting that if the service leads are brought in overhead, along the wall of the block, or through the false roofs, there will be no necessity for any wiring below the ceiling of the ground floor. Assuming the building to be of two stories, the bedroom lights will be wired in the roof, and the ground-floor lights under the bedroom floors. Only one gauge of wire will be used throughout the installation in one house, and therefore only one pair of fuses will be needed, where the service enters the house. In concluding our remarks on wiring, we may repeat that excessive regard for safety from risks which, in house installations, are mainly imaginary, has become a fetish in this country; foreign practice for many years has proved this statement, and without stooping to shoddy methods, by the exercise of common-sense and forethought the wiring can be very greatly cheapened.

So far the question of lighting alone has been considered; the use of cooking and heating apparatus will be dealt with in further articles.

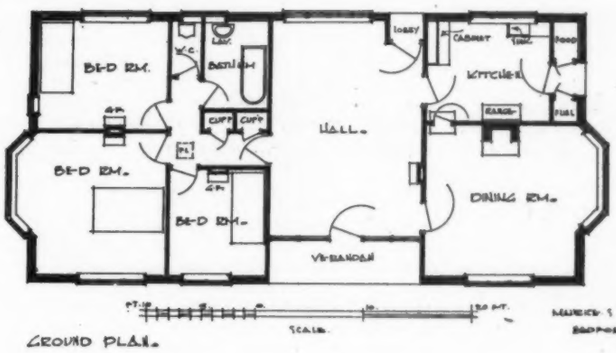
New Uses for Rubber.

The recent announcement of the Rubber Grower's Association (Inc.) to award £5,000 in prizes for ideas and suggestions for extending the present uses, or for encouraging new uses for rubber, is receiving considerable attention. Already numerous sealed entries have been forwarded for adjudication. The closing date is December 31 next, so there is still time for intending competitors to send in their suggestions. Conditions governing the competition may be obtained from The Rubber Growers' Association (Inc.), 38, Eastcheap, London, E.C.3.

BUNGALOW AT BEXHILL.

THIS bungalow is about to be erected by Messrs. James Bodle, Ltd., of Eastbourne, to designs and plans prepared by Mr. Maurice S. R. Adams, A.R.I.B.A. The contract sum of £1,818 includes £84 for gas and £53 for electric heating and lighting services. Approval for the full subsidy of £260 has been obtained. The large hall sitting-room, with verandah in front, faces the sea. The dining-room and principal bedroom will have open roofs with exposed timbers; wall to be of 9 in. brick faced ¾ in. roughcast, and plaster on inside. Woodwork to be painted emerald green outside to contrast with the roughcast, which will be whitened by a pigment mixed in the finishing coat. Inside woodwork is to be stained dark, including wood floors. Kitchen, bath-room and office floors are to be of red composition, and the verandah will be paved with red quarry tiles. The oak beam and brackets to verandah front will not be painted. The roofs are to be boarded, felted and covered with hand-made faced tiles.

BUNGALOW. RICHMOND ROAD. BEXHILL. for THE MISSES HOADLEY.

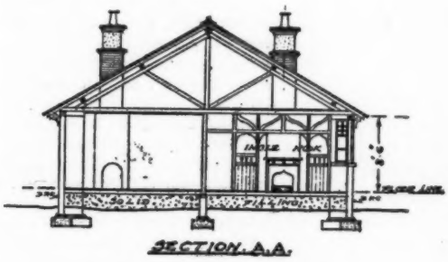


GROUND PLAN.

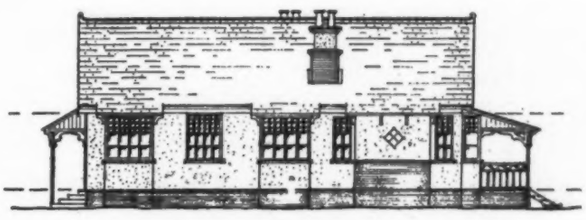
MR. MAURICE S. R. ADAMS, A.R.I.B.A., Architect.

BUNGALOW AT STAINES.

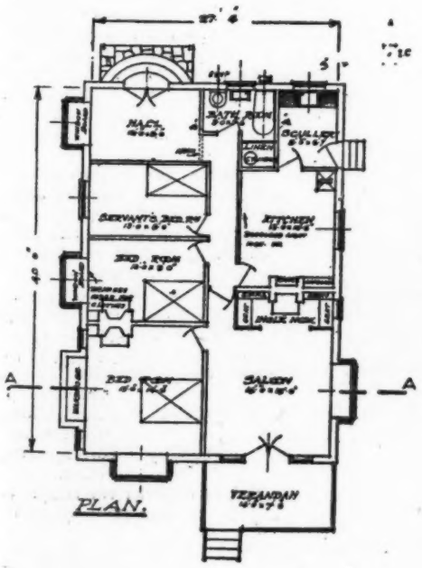
THE bungalow illustrated on this page, "The Paddock," Laleham-road, Staines, for Mr. H. Fear, was designed by Mr. Ernest C. Thomson, architect, of "Magpie," Riverside, Staines. The whole floor area is covered with two feet of dry ashes in which the floor joists are bedded, thus maintaining perfectly dry timbers and floor, raising the floor two feet above ground, and giving a fine outlook from the verandah, which commands views up and down the river. The brickwork, where showing, is built in lime mortar with red T.L.B. crown star bricks, a cheaper brick being used under the rough-cast. Relief is obtained by using blue Staffordshire tiles in decoration and for window-sills. Old 9in. by 4 in. beams are used in the saloon, showing below the plastered ceiling, with white frieze and oak picture rail. The walls are to be panelled out with oak fillets. Wardrobes are built out in the bedrooms, and plastered inside, requiring only a front framing and doors to form a piece of furniture. The wardrobe doors are glazed with silvered glass. The window bays have window boards or seats; in the bedroom drawers under are provided for clothes; and in the saloon and hall lockers are placed under the seats. The roof is covered with red Broseley tiles, and overhangs at the eaves with projecting rafters and brackets; at the gable ends relief is provided with half-timber work. In the kitchen the cooking will be done partly by the range and partly by an electric cooker. The illumination will be electric light. The drainage is simply arranged at the rear and taken direct to an interceptor chamber and thence to the sewer in the road. The builder is Mr. G. Weller, of Staines.



SECTION. A.A.



ELEVATION. TO. GARDEN.



PLAN.

ELEVATION. TO. RIVER.

BUNGALOW.
FOR H. FEAR. ESQ.
THE PADDOCK
STAINES.

SCALE. OF. FEET.

MR. ERNEST C. THOMSON, Architect.

CENTRAL HEATING AND VENTILATION.—II.

By A. J. WELLS.

HEAT LOSSES.

THE first consideration in the design of a heating system is to ascertain the quantity of heat necessary for raising and maintaining a room or building at a desired temperature above that of the external air. Unfortunately, there are so many variable factors beyond human control to contend with, which affect and determine the quantity of heat required, that no definite rule or formula has been evolved for the calculation which can be called "scientific." This statement, however, is no argument in favour of many who advocate the use of haphazard and obviously unsound methods, for although the calculations are not "scientific" in the true meaning of the term it is most important that they should be based upon sound reasoning. When a building has an internal temperature higher than that of the external air it gives up heat through the exposed walls, windows, roof, &c., exactly in the same manner as a radiator gives up heat in a room. The rate at which the building will transfer heat depends upon the area of exposed surface, the heat resistance of the building materials and the difference in temperature between the inside and outside of the building. It is, therefore, obvious that, to maintain a constant internal temperature, heat must be supplied at the same rate as the building emits it.

The quantity of heat should be measured and stated in terms of "heat units." The "unit" used in this country and in many other English-speaking countries is the British Thermal Unit. One "unit" represents the quantity of heat required to raise one pound of water through one degree Fahr.; and, similarly, 1 lb. of water cooling 1 deg. Fahr. gives up or emits one B.T.U. To determine the quantity of heat flowing out of a building we must consider the following:—

(1).—Heat transmission through the walls, windows, roofs, floors, &c., which is dependent upon:—(*a*) Heat resistance offered by the building materials; (*b*) temperature difference between internal and external surfaces; (*c*) condition of internal air, *i.e.*, at rest or in motion, humid or dry; (*d*) condition of external air, *i.e.*, at rest or in motion, humid or dry.

(2).—Air leakage or interchange, *i.e.*, heat loss caused by the hot air passing out of the crevices and openings in and around the walls, windows, doors, skylights, &c., and the heat absorbed by the cold incoming air. This loss is dependent upon:—(*e*) Construction of building and materials used; (*f*) quality of workmanship; (*g*) difference in pressure between internal and surrounding air. It has been the usual practice to assume that the air leakage is directly proportional to the volume of a room or building; in fact the assumption can be found stated as a definite law in many text-books on the subject. Now, the air leakage has nothing whatever to do with the volume of a room, the only dimension having a slight bearing on the question is the height. A far more reasonable method would be to assume the interchange as proportional to the heat loss of the exposed materials, because a room having no transmission loss would have very little, if any, air leakage. If flues or air vents are provided, the volume of air passing up should be calculated to determine the quantity of heat absorbed. Another method of allowing for air leakage is to measure the perimeter of exposed windows and doors, and multiply by various constants for different constructions. This method is quite sound, because the major portion of leakage is through the clearance around the windows and doors.

(3).—Internal temperature of a building, which is dependent upon the type of building and the purpose for which it is used. The following list gives the internal temperatures usually adopted in this country:—Public buildings, 58–60 deg. Fahr.; offices, 55–60 deg. Fahr.; residences, 60–65 deg. Fahr.; hospitals, 60–80 deg. Fahr.; schools, 55–65 deg. Fahr.; horticultural buildings, 50–100 deg. Fahr.; factories, 50–55 deg. Fahr.

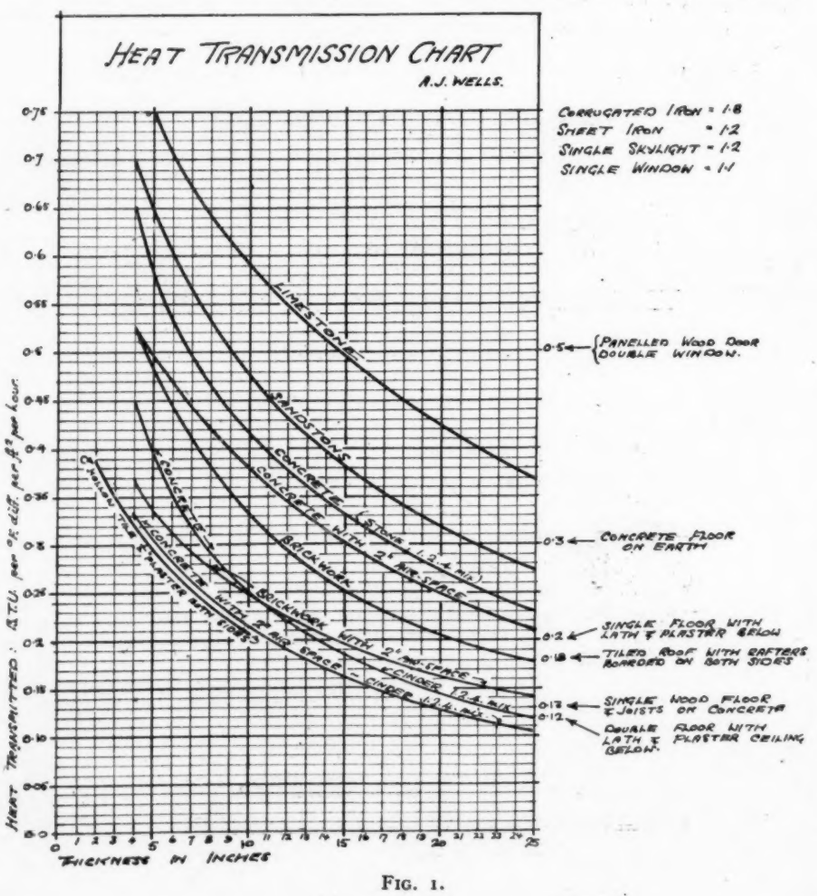

HEAT TRANSMISSION CHART
A.J. WELLS.
CORRUGATED IRON = 1·8
SHEET IRON = 1·2
SINGLE SKYLIGHT = 1·2
SINGLE WINDOW = 1·1
LIMESTONE
SANDSTONE
CONCRETE
CONCRETE WITH 2" AIR SPACE
BRICKWORK
BRICKWORK WITH 2" AIR SPACE
CINDER CONCRETE
PANELLED WOOD DOOR DOUBLE WINDOW.
CONCRETE FLOOR ON EARTH
SINGLE FLOOR WITH LATH & PLASTER BELOW
TILED ROOF WITH RAFTERS BOARDED ON BOTH SIDES
SINGLE WOOD FLOOR & JOISTS ON CONCRETE
DOUBLE FLOOR WITH LATH & PLASTER CEILING BELOW
HEAT TRANSMITTED: B.T.U. per °F. diff. per ft² per hour.
THICKNESS IN INCHES

FIG. 1.

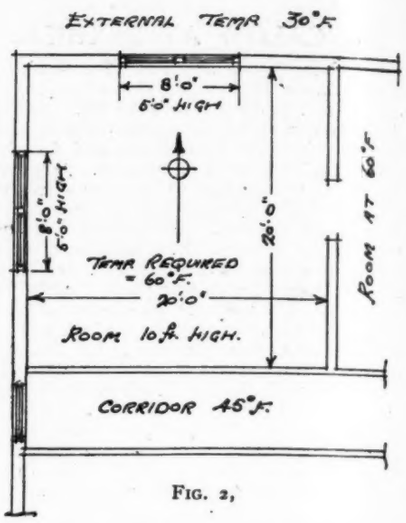


FIG. 2.

(4).—External temperature, which in this country is usually taken at 30 deg. Fahr., although this temperature is rarely reached except in exposed districts for more than a few hours during the whole heating season.

(5).—Intermittent heating, which is usually accounted for by increasing the calculated heat loss by 10 to 30 per cent., according to the time interval. This method is open to severe criticism, because the heat emission from radiators—especially in vapour heating—is greater when the apparatus is first started than the calculated emission; and, further, the air interchange is not so great in the first instance as it is when the room is heated.

When the heat loss of a building has been determined as closely as possible, the heat provided by agencies apart from the pipes and radiators of the heating system, such as human beings, illuminants, &c., should be calculated. This calculation is only necessary for public or semi-public buildings, when it often happens that the audience or congregation supply enough heat to provide for maintaining the building at or above the desired temperature; in such buildings a modern ventilating plant is absolutely necessary. It is usual to assume that each person emits 350 B.T.U. per hour, and to calculate the illuminants on the heating value and quantity of illuminating medium used.

CALCULATIONS.—The heat transmitted through exposed surfaces is represented by,

$$h = ab(t_1 - t_2)k.$$

Where h = heat transmitted per hour.
a = area of surface in ft.²
b = aspect coefficient (values given below)
k = transmission coefficient (see Fig. 1).
t_1 = inside temperature °F.
t_2 = outside temperature °F.

Values of "b":—

Exposed surfaces facing	North	= 1.20
,, ,, ,,	East	= 1.15
,, ,, ,,	West	= 1.10
,, ,, ,,	South	= 1.00

Equation No. 1 must be calculated for each different kind of surface, and the sum of the results multiplied by "c," the air leakage coefficient, which has the following values:—

Buildings of good construction	c	= 1.20
,, ,, average ,,	c	= 1.40
,, ,, poor ,,	c	= 1.60 to 2.0

Therefore the total heat required in a room or building is represented by:—

$$H = c(t_1 - t_2)(a_1 b_1 k_1 + a_2 b_2 k_2 + a_3 b_3 k_3 \ldots\ldots).$$

Where $a_1 a_2 a_3$ = areas of various exposed surfaces.
$k_1 k_2 k_3$ = corresponding transmission coefficients.
$b_1 b_2 b_3$ = corresponding aspect coefficients.

Let us consider the simple problem given in Fig. 2. A room 20 ft. by 20 ft. by 10 ft. must

be heated to 60 deg. F. when the external temperature is 30 deg. F. One 9 in. brick wall faces north, another south, the third separates the room from an adjoining room (which is at 60 deg. F. and, therefore, will transmit no heat), and the fourth is a 4½ in. brick wall separating the room from a corridor which is at 45 deg. F. The room contains two exposed windows constructed of single glass. The rooms above and below are heated to 60 deg. F., so that no transmission takes place through the floor or ceiling.

Referring to the "Heat Transmission Chart" we obtain the following values for "k":—

9 in. brick wall = 0.35 B.T.U. per deg. F. diff. per ft.² per hr.

4½ in. brick wall = 0.50 B.T.U. per deg. F. diff. per ft.² per hr.

Single glass window = 1.10 B.T.U. per deg. F. diff. per ft.² per hr.

From the plan in Fig. 2 we obtain :—

North wall = 20 ft. × 10 ft. = 200 ft.² area.
„ window = 8 ft. × 5 ft. = 40 ft.² area
∴ net area of wall = 160 ft.².

By equation No. 1 :—

$h = 160 \times 1.20\ (60–30)\ 0.35$
= 2020 B.T.U. transmitted through north wall per hour;

and similarly,

$h = 40 \times 1.20\ (60–30)\ 1.10$
= 1580 B.T.U. transmitted through north window per hour.

∴ total transmission through north exposure = 3600 B.T.U. per hour.

The transmission through west exposure would be the same as for north, except that b = 1.10 instead of 1.20.

$$\therefore \frac{3600 \times 1.10}{1.20} = 3300 \text{ B.T.U. per hour for west exposure.}$$

Transmission through corridor wall =
$200 \times 1.0\ (60–45)\ 0.50 = 1500$ B.T.U. per hour.

Total heat lost by transmission =
3600 + 3300 + 1500 = 8400 B.T.U. per hour.

Assuming an average construction for the air leakage coefficient, c = 1.40. Therefore heat loss of room including air interchange :—

= 8400 × 1.40
= 11800 B.T.U. per hour Total.

Communal Hot Water.

At a meeting of the Institution of Municipal and County Engineers, at Beckton Gas Works last week, when Mr. F. W. Goodenough read a paper on "Gas in Relation to the Housing Problem," Mr. James Thomson (Burgh Surveyor and Engineer, Dundee) said in the ensuing discussion that an experiment in hot-water circulation at Dundee had proved a complete success, but he would not recommend its adoption in any housing scheme unless a communal laundry were included. In Dundee 250 new houses and a number of old houses in the immediate neighbourhood were supplied by the communal laundry with water heated to 190 deg. for twenty-four hours in the day, all the year round, for 2s. 6d. per week. Apart from a saving of from 3s. to 4s. a week in coal, the housewife was enabled to come down in the early morning to a room already warmed, and, with the assistance of a gas-cooker, the already hot water could be boiled in a few seconds.

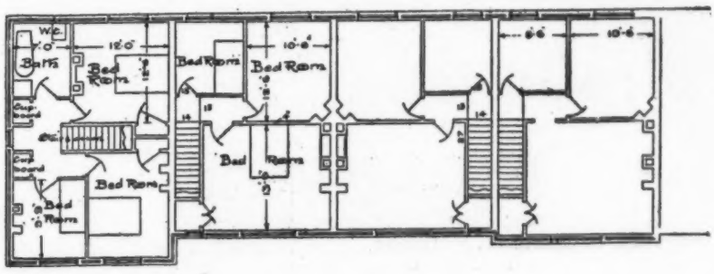
MINERS' COTTAGES.

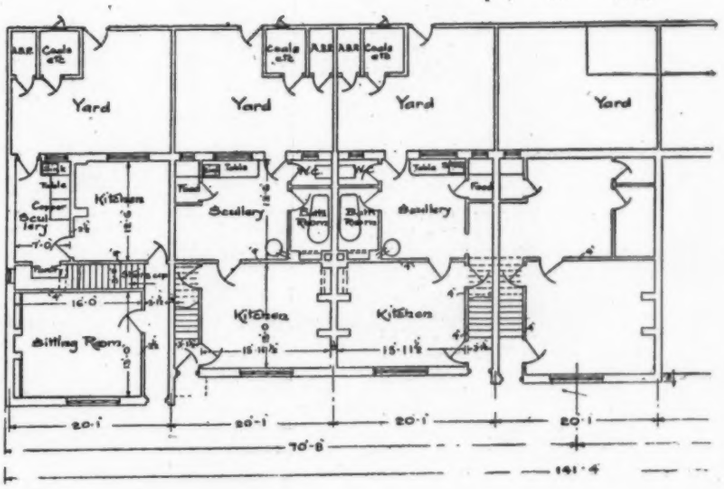
We illustrate on this page some cottages which are being erected for Lord Joicey at the Lambton and Hetton Collieries, at Durham. The work is being carried out on a patent system of concrete construction by Messrs. A. F. Jefferies & Co., of 25, Victoria-street, Westminster, S.W. 1; several hundred cottages on this system are to be erected at the Lambton and Hetton Collieries, and others are to be built at Darlington. At Filey some residential villas and chambers are shortly to be built on this system.

In this method of concrete construction the wall blocks and their units are made complete in one operation in special machines to the inventor's design. Thirty complete blocks per man per hour are turned out, the dimensions being 2 ft. 3 in. by 9 in., and in thicknesses of 2 in., 2½ in., 3 in., and 4 in. The external walls are built with a continuous cavity of 2 in.; the outer block or leaf is 3 in. thick with a waterproof face; the inside block is 4 in. thick, finished with a porous face. The wall is tied with ordinary wall ties, two per yard super. The blocks are made with two frogs and the centre of the block on elevation is left with a 4 in., and the two extreme ends with a 2 in., width of solid matter; therefore, when the blocks are built together, there is formed at every 13 in. centre 4 in. of solid matter, which runs perpendicularly throughout the entire height of the wall. The weight on the foundations is claimed to be about 40 per cent. less than 9 in. solid brickwork, and the blocks are light and easy to handle. It is stated that one cube yard of aggregate will produce 16 yards super. of 3 in. frogged blocks, as compared with 9 yards super. of 3 in. solid cast blocks.

The floor blocks are cast in the same manner as the wall blocks, but the sizes are 2 ft. 6 in., 2 ft. 8 in., and 2 ft. 10 in. by 2 ft. wide; the various length dimensions are to enable any width floor to be spanned, avoiding cut bays. The two frogs on each slab, when bedded together, form a chamber which forms a sound-proof and fire-proof block, and as soon as they are laid they are ready for the plastic floor finish. A cove of 3 in. radius is formed completely around the room, and the same material is turned up the wall 5 in. or 6 in. to form a skirting.

The beams are 4 in. by 9 in., which will span 14 ft. and carry a safe load of 1 cwt. per foot super. of the floor area. The beams are prepared before being delivered to works, and before being built into position are treated with a special liquid and stained. No trimming is required for hearths or staircase ways, and the whole weight of floors is carried on the inner wall. The whole of a flat roof type house can be erected without a nail or screw, with the exception of the fascia. The system has been approved by the Ministry of Health.





Miners' Cottages, for the Lambton and Hetton Collieries, Ltd.

HOUSING AND TOWN-PLANNING NOTES.

National Savings and Housing.

In accordance with an arrangement already announced, 50 per cent. of the gross proceeds from the sale of National Savings Certificates in any area may from now be borrowed by the local authority of that area for local building purposes.

The Housing Subsidy.

A long-felt want is fulfilled by the publication by the Ministry of Health of a small pamphlet entitled "How to Get a House of Your Own," which is issued gratis from the offices of the Ministry and of the Housing Commissioners. The pamphlet contains full particulars of the procedure to be followed in order to obtain the Government grant, ranging from £230 to £260, to private persons building houses, and also illustrates some typical houses and bungalows which would rank for the subsidy.

WEEKLY HOUSING RETURN.

Progress of housing schemes up to September 25:—Schemes submitted, 11,139; approved, 8,105. Lay-out schemes submitted, 6,205; approved, 5,587. House-plans submitted, 259,972 houses; approved, 244,472. Tenders submitted, 159,969; approved, 144,789. Contracts have been signed for 106,902 houses.

Schemes dealt with during the week ended September 25:—Schemes submitted, 44. Lay-outs submitted, 77; approved, 45. House-plans submitted, 2,106; approved, 2,812. Tenders were submitted for 3,479 houses and approved for 1,835. These schemes include the following:—

Applications.

SITES.

URBAN.—Wolstanton United, 12.33 acres.
RURAL.—Blackwell, 53.06 acres.

LAY-OUTS.

URBAN.—Alvaston and Boulton, Bermondsey, Loughborough, Oswaldtwistle, Portmadoc, Stanley, Tottington, Waltham Holy Cross, Waterloo-with-Seaforth.

RURAL.—Alcester, Ashbourne, Auckland, Barrow-on-Soar, Brandon, Caxton and Arrington, Chipping Norton, Dartford, Docking, Foleshill, Grimsby, Highworth, Houghton-le-Spring, Leigh, Lexden and Winstree, Lichfield, Liskeard, Llandilo Fawr, Lutterworth, Malmesbury, Newbury, Northallerton, Stratford-on-Avon, Thetford, Williton, Wisbech.

COUNTY COUNCILS.—Lancashire, Warwickshire.

HOUSE-PLANS.

URBAN.—Bermondsey, 3 houses; Cardigan, 40; Folkestone, 122; Gt. Harwood, 72; Llanelly, 6; Loughborough, 24; Market Rasen, 12; Northfleet, 124; Southwick-on-Wear, 12; Sowerby Bridge, 35; Stalybridge, 400; Stockport, 2; Urmston, 52; Wakefield, 467.

RURAL.—Alcester, 36 houses; Alvaston and Boulton, 10; Ampthill, 10; Axminster, 4; Barrow-on-Soar, 24; Bath, 1; Bedford, 8; Brandon, 44; Bromley, 50; Buntingford, 6; Caxton and Arrington, 4; Chipping Norton, 8; Chorley, 8; Conway, 6; Dartford, 6; Docking, 10; E. Westmorland, 4; Gower, 34; Grimsby, 24; Gwyrfai, 4; Henley, 6; Lexden and Winstree, 10; Liskeard, 2; Llandilo Fawr, 90; Lutterworth, 12; Newbury, 8; Northallerton, 30; Pembroke, 8; Penybont, 74; Potterspury, 4; Sevenoaks, 2; Stratford-on-Avon, 114; Tarvin, 8; Thetford, 2; Tiverton, 25; W. Lancashire, 4; Wimborne and Cranborne, 12; Wisbech, 10.

COUNTY COUNCIL.—Lancashire, 2.

Approvals.

SITES.

RURAL.—Blackwell, 15.66 acres; Orsett, 12.35.

LAY-OUTS.

URBAN.—Bedwas and Machen, Bermondsey, Haslingden, Loughborough, Oswaldtwistle, Tottington, Waterloo-with-Seaforth.

RURAL.—Alcester, Alton, Barrow-on-Soar, Blean, Brandon, Bromley, Caxton and Arrington, Chipping Norton, Conway, Docking, Foleshill, Highworth, Lexden and Winstree, Leyburn, Lichfield, Liskeard, Newbury, Reigate, Romsey, St. Germans, Stratford-on-Avon, Thetford, Wakefield, W. Ashford, W. Dean, Wisbech.

COUNTY COUNCILS.—Warwickshire, Yorkshire (E. Riding).

HOUSE-PLANS.

URBAN.—Bermondsey, 3 houses; Bradford, 604; Bridlington, 150; Carnforth, 55; Cottingham, 98; Folkestone, 122; Haslingden, 4; Loughborough, 24; Manchester, 371; Selby, 248; Stockport, 2; Urmston, 52; Wakefield, 467.

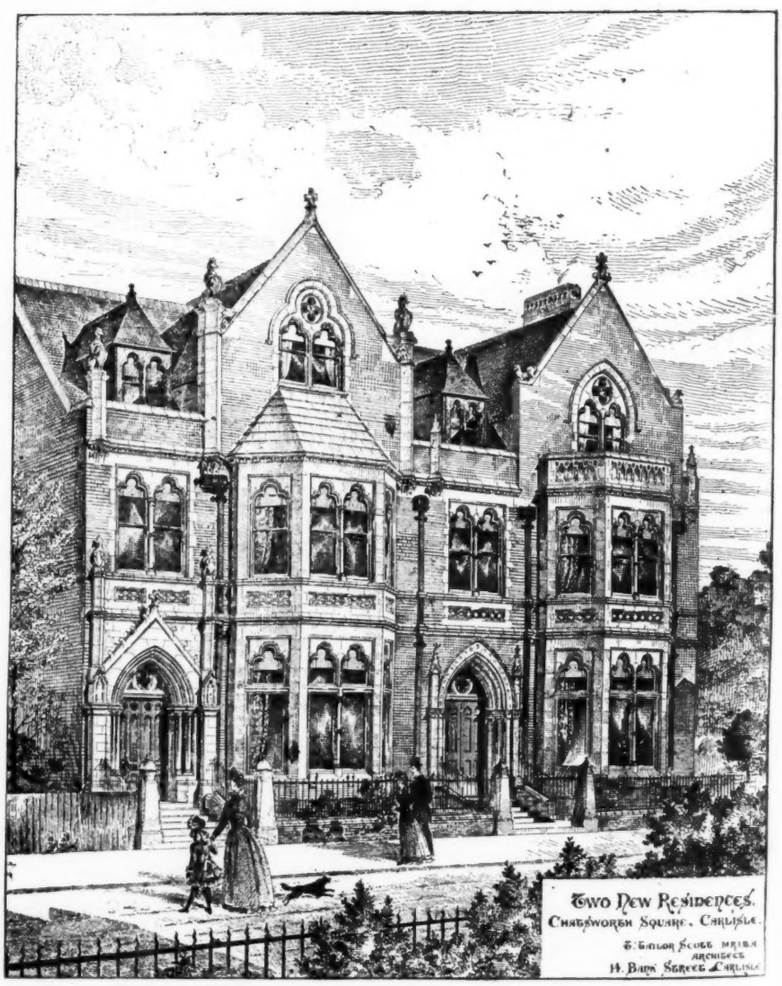
RURAL.—Alcester, 36 houses; Alton, 6; Ampthill, 6; Axminster, 4; Barrow-on-Soar, 24; Bedford, 8; Blean, 20; Brandon, 44; Bromley, 50; Caxton and Arrington, 4; Chipping Norton, 8; Chorley, 8; Conway, 14; Docking, 10; Goring, 4; Gower, 34; Lexden and Winstree, 10; Liskeard, 2; Newbury, 8; Penybont, 74; Potterspury, 4; Reigate, 4; Romsey, 2; St. Germans, 12; Sevenoaks, 14; Stratford-on-Avon, 114; Thetford, 2; W. Ashford, 10; W. Dean, 54; W. Lancashire, 4; Wisbech, 10.

COUNTY COUNCILS.—Oxford, 1; Yorkshire (E. Riding), 2.

Tenders Approved.

RURAL.—Ampthill, 14 houses; Barrow-on-Soar, 24; Bedford, 6; Blaby, 12; Braintree, 50; Bromsgrove, 22; Buckingham, 14; Cardigan, 2; Catherington, 22; Chelmsford, 6; Cheltenham, 4; Christchurch, 14; Colwyn, 8; Culmstock, 8; Docking, 10; Dunmow, 16; E. Westmorland, 2; Eaton Socon, 4; Gower, 34; Henley, 8; Keighley, 10; Lexden and Winstree, 10; Malmesbury, 4; Pershore, 20; Saffron Walden, 8; St. Neots, 4; Sedgefield, 18; Skegby, 8; South Stoneham, 14; Uckfield, 25; Ulverston, 8; Warminster, 4; Westbury and Whorwellsdown, 4; Wisbech, 10; Woodbridge, 68.

URBAN.—Bracebridge, 4 houses; Brecknock, 20; Brentford, 76; Brighton, 20; Coseley, 194; E. Ham, 20; Eastleigh and Bishopstoke, 100; Erith, 93; Filey, 18; Finchley, 200; Guildford, 4; Hornsea, 16; Ilford, 21; Liverpool, 4; Long Eaton, 4; Loughborough, 24; Orrell, 72; Poplar, 6; Rhymney, 50; Richmond, 114; Southgate, 14; Standish-with-Langtree, 57; Stoke Newington, 18; Ulverston, 18; Whickham, 60; Wimborne Minster, 20; Wood Green, 24.



Two Houses at Carlisle. MR. T. TAYLOR SCOTT, F.R.I.B.A., Architect.

[These two residences are built with Ruabon bricks and polished white stone from the local quarries, with a considerable amount of carving. The interior of each residence has three reception and six bedrooms, besides other accommodation, finished in pitch pine and oak.]

PROTECTION AGAINST LIGHTNING.

The Desirability of Protection.—From the days of Benjamin Franklin, in the middle of the 18th century, the scientific world has advocated the protection of exposed and isolated buildings against lightning, and experience has conclusively proved that when lightning rods are properly installed and kept in repair they give reliable protection. The general public has been somewhat more sceptical, due, no doubt, mainly to the ignorance of the persons often erecting the rods, but partly to the disagreement in the past regarding some of the fundamental facts which are necessary to the proper understanding of the subject. This disagreement has unfortunately led many persons to be doubtful of the merits of any lightning rod equipment, but since efforts have been made by scientists to explain the principles of a proper installation, and to train men to erect the rods on a scientific basis, much of this scepticism has vanished. The need, however, for further investigation of the electrical characteristics of lightning, in order that the design of lightning rods may be placed on a sounder basis, with a view to bringing about a greater uniformity of practice in their installation, and also for the encouragement of persons to make use of them as a protective device, is apparent.

To prove the efficiency of lightning rods many laboratory tests have been made, and the conclusions drawn show very plainly the practical advantages of rodding in a scientific manner; and much valuable information has been acquired in this way. The public has, however, hesitated to take these tests as finally proving that the results achieved in the laboratory experiments and in a building during a heavy thunderstorm would be the same.

In order, therefore, that actual results may be considered, the statistics of fire insurance companies, who are probably in closer touch with the damage done by lightning than even the owners, may be taken. In many of the States in America there are insurance companies who accept risks on both rodded and unrodded buildings, while others take only buildings which are rodded. The installation as well as the materials used have to be approved by their inspectors before the acceptance of a risk. The Farmers Mutual Lightning Protected Insurance Co., of Michigan, who insure rodded buildings only, during the four years (1909-1912), with a total insurance for these years of over $55,000,000, paid out only $32 for damage caused by lightning. The Patrons Mutual Fire Insurance Co., of Michigan, who insure both rodded and unrodded structures, in eleven years received only three claims for damages on rodded buildings. In Iowa, over 50 companies keeping the necessary data report that about 50 per cent. of their risks are on rodded buildings, and the efficiency of the rods showed 98.7 per cent. over eight years' business. In Ontario, the Fire Marshal reported for the year 1917 that lightning was responsible for 51 per cent of all losses to farm property, the amount of the damage being $660,164, and only one of these buildings was rodded. The efficiency of rodded buildings for 1915 was given as being 96.1 per cent. in the number of buildings struck, and 99.9 per cent. in damage done. The damage was caused chiefly through side-flash.

When it is considered that these reports cover, in all probability, some defective rodding, the true efficiency of lightning rods, as erected, can hardly be disputed, and the advisability of protecting isolated and exposed structures is now generally conceded. The most prevalent causes of failure are an insufficient number of grounds and conductors and poor earth connections, but whenever proper precautions are taken in the selection of the rods and in the firm which erects them the chances of loss by lightning to either person or property is indeed small.

Being satisfied that almost absolute protection to buildings can be obtained, the next step to consider is the cause of lightning, and a few fundamental facts in physics which bear upon this subject.

The Cause of Lightning.—Lightning is the visible flash accompanying an electrical discharge in the sky. The thick, dense clouds which are the usual prelude to a thunderstorm are charged on the side facing the earth with positive electricity, while the earth is charged with negative electricity. There is a mutual attraction between these—the cloud and the earth—and if the air can hold them apart there will be no flash, but if the electricity breaks through, the air through which the electric current passes is made white hot, or what is usually termed the "stroke" takes place. To prevent lightning, therefore, the clouds and the earth must be kept apart, or, in other words the strain put on the resistance of the air by the pressure of the current must not be sufficient to break it down and thus cause a flash. As the storm clouds pass over a building or other obstacle, they draw the negative of the earth over the obstacle and thus charge it by induction, thereby rendering it especially liable to be struck. To prevent the building from becoming charged is the aim and object of lightning rods; physics teach us that a charge of electricity is a necessary antecedent condition to all electrical phenomena.

It is generally conceded that railway engines, steel-framed buildings and windmill towers are never damaged by lightning because the metal acts as a conductor between the earth and the air Therefore, buildings or other objects that are poor conductors of electricity and are exposed to the violence of storms, such as farm buildings, church steeples, etc., should be made conductors of electricity by installing rods in such a manner as to prevent the building from becoming charged. The following facts in physics may be of interest to those interested in this subject:—"Whether electricity passes between two points of a conductor and in which direction, if at all, depends upon the relative potential of the two points. If they have the same potential, no transfer takes place, but if they have different potentials there is a transfer, and the point from which the electricity passes is said to be at a higher potential than the point to which it flows"; being somewhat analogous to water finding its own level. It is also known that "if a conductor connected to the earth is charged with positive electricity the flow is towards the earth, if with negative the flow is from the earth."

Designing a System of Protection.—Lightning rods are generally divided under three heads: (1) The air terminal, or point; (2) the conductor, or rod; and (3) the earth terminal, or ground. The prevailing practice in the United States and Canada is to use either copper or iron rods. Aluminium has been seldom used, and rods of a combination of two metals have been tried, but they are not recommended as being subject to electrolytic action and, therefore, not as durable as rods of one metal.

The physical properties of the three metals are:—

	Copper.	Aluminium.	Iron.
Specific gravity	8.89	2.70	7.7
Melting point	2012°F.	1157°F.	2840°F.
Conductivity	100	48	16

Copper is the best available conductor of electricity, and, as one of the most important qualities of a rod is its resistance to atmospheric and soil corrosion, copper has been used very extensively. The corrosion by the smoke from chimneys can be overcome by coating the exposed portion with lead. Regarding the question of resistivity, which has been much discussed, it is claimed that the resistance of the rod is, in most cases, small in comparison with the resistance of the earth connection, and, therefore, of no very great importance.

Aluminium stands next to copper in conductivity value and is not easily corroded, but it is very sensitive to the action of alkalies. It is also highly electro-positive, so that when used for rods all the parts should be of this metal in order to avoid galvanic action.

Iron has the advantage in the matter of high-frequency resistance and in price, and it is no doubt the latter quality that has often caused iron to be used. It must be well coated with zinc to prevent corrosion.

Conductors or rods approved by the National Board of Fire Underwriters as "Standard," if of copper are to be in the form of a flexible cable or a rigid tube, bar or rod; if of steel, to be of the twisted star section form. The weight of the copper cable is to be not less than 3 oz. to the foot (187.5 lb. per 1,000 ft.), with the individual wires of the cable not less than 0.045 in. in diameter, and may be of the rope lay, loose twist or braided types, with or without a supporting core. If a rigid tube, bar or rod is used the weight must be the same as for the copper cable. The star section steel rod is to be made of mild steel, with a diameter of about ½ in. from point to point and having a weight of not less than 320 lb. per 1,000 ft. of length. It must be coated with 20 lb. of zinc per 1,000 ft.

These weights are for structures not exceeding 60 ft. in height; for those over 60 ft. and not exceeding 150 ft. the above weights must be doubled, and if over 150 ft. they must be trebled. There must be as few joints as possible, and these must be mechanically and electrically secured and protected from corrosion. No insulators are to be used, as the rods are intended to be in metallic connection with the building in order that the charge may flow up the rods to the points and into the air. All the metal pipes, &c., in the building, such as eaves troughs, water and drain pipes, should be so connected to the rods that they may assist them.

Air terminals or points are required within 2 ft. of each chimney, cupola, ventilator and gable, and additional terminals spaced not over 25 ft. apart on the roof ridges. These points must be very carefully attached to the structure to prevent them being blown over or otherwise damaged. They are either solid or in the form of a hollow cone surmounting a short section of tube. The points are usually about 8 in. high and are preferably solid. If tripods are used, the legs should not be less than ¼ in., or if of four legs not less than $\frac{1}{16}$ in., and firmly bolted to the roof, as it is very important that these supports be kept vertical.

Earth connections or grounds are probably the portion of the lightning rod system that need most attention, as once covered over one cannot see the faults. They must be taken down to permanent moisture, usually from eight to ten feet below ground level, and below the level of the footings, in any case. Efforts should be made to obtain the lowest possible resistance consistent with economy, and when bed-rock is near the surface it may be difficult to obtain the best results; but often by connecting to a water or drain-pipe or by attaching a large plate to the end of the conductor fairly satisfactory results may be obtained.

Damage to the rods where they enter the ground must be carefully guarded against by a box around same, or by some other method, and care must be taken that the seepage from manure pits does not corrode the metal. The number of ground terminals required is dependent upon the number of air terminals. If the air terminals do not exceed six, two ground terminals are usually considered sufficient and should be at diagonally opposite corners. Three terminals should be provided where more than six points are used and not more than twelve, and an additional ground for each five points after the first twelve.

The above gives an outline of the practice in the United States and Canada at the present time for the installation of lightning rods, and any further investigations made to bring about greater uniformity of practice should be encouraged.

THE BUILDING TRADE.

LABOUR TROUBLES: THE MEN AND THEIR LEADERS.

TRADE unionism has, we know, of late been subjected to considerable criticism, much of which has doubtlessly been unmerited; nevertheless, to cease to oppose certain trade union tactics would be nothing less than a failure to perform a public service. Such tactics affect not only the interests of the community as a whole, but that very section of the community which the unions wish to assist. An example of such measures, which would seem to be utterly subversive to all principles of individual liberty of action, has recently come to our notice. After a spell of bad weather the bricklayers engaged on a certain job approached their employers in order to ascertain if they might be permitted to work after the usual hours so that their weekly earnings, which otherwise would be low owing to lost time, might be increased. Assent was given to this request. The matter, however, was soon brought to the notice of the local branch of the union, which not only insisted that the practice should stop but also demanded that the wages received from work performed during those hours should be handed over as a fine to the union. This the men refused to do, and at the same time they discontinued paying their subscription to the union, from which they have now seceded. The union then approached the firm who were engaged on the joinery for this job, and asked them to discontinue this work so that the job might be held up, and threatened, if they refused, to call out all their joiners. The firm, of course, refused, but the threat was never carried out, and there is little doubt that had the union attempted it the men would not have obeyed.

It would be difficult to condone such action under any circumstances, but it becomes even more unwarranted when it is appreciated that the particular job to which this deplorable incident refers is a large housing scheme, and it becomes difficult not to agree with the statement of Dr. Addison that labour has lost a unique opportunity for bettering its own class and for furthering social reform by the recalcitrant attitude which it has consistently adopted towards housing schemes. The unwillingness of the trade unions in any way to accommodate themselves to the prevailing conditions is shown by the statements made by various officials to the effect that if all other building were stopped there would be sufficient labour to carry out all the housing schemes. This may be perfectly true, but why should other building be stopped? Would it not be wiser to increase the number of men engaged in the building industry? It seems hardly conceivable that the fear of future unemployment is the real cause of the obstruction. By every portent it would appear that there will be enough work to absorb, and keep constantly employed for a long period of years, a very much larger number of men than is at present engaged in the industry; and even were this not so, is not the question of present unemployment, and that of ex-Service men—which is no mere speculation but a present reality—at least equally as important as a questionable future unemployment? Foresight and caution are excellent qualities, but this savours to us more of selfishness and obstinacy.

No one will, we think, accuse us of having adopted an inimical attitude towards labour in the past, for we have always realised too fully to make the adoption of such an attitude conscientiously possible that the claims of labour for improved conditions, for better standards of living, and for a fuller share of life's amenities, not only in the building industry itself but in all the countless ramifications of labour, have been, for the most part, fully justified. We feel sure that the time has come when a definite discrimination can be made between the attitude of labour and some of the trade union leaders. They are becoming ever more inimical. The opinions of the officials are not, in many cases, the opinions of the men whose spokesmen they profess to be and whose policy they endeavour to direct; neither are their actions in agreement with the men's wishes. The incident which we have related is significant, and it is easy to appreciate the disgust and disappointment which many operatives who have perhaps for many years subscribed to these very unions must feel on finding themselves faced with the dilemma of either forfeiting their contributions by secession or of continuing them to further an aggressive policy with which they feel no sympathy.

We feel convinced that many of the operatives are willing to work quietly and steadily if they could be liberated from the constantly harassing interference of the union officials. There are still to be found on every job men who take a real interest in their work and craft, and to whom the probability of unreasonable strikes for unreasonable demands is a perpetual discomfort. There must be others who view with real apprehension the decaying standard of workmanship which is the inevitable outcome of the insidious doctrine of discontent which is being spread on all sides.

We have heard the trade unions inveigh against the Government on account of parsimony and bad building in connection with housing schemes, but surely they are not so purblind as to fail to see that they themselves are almost entirely responsible for these things? There are limits in expenditure beyond which it is not possible to go, and in order to keep within these limits it becomes necessary to adopt every conceivable economy. Thus it is no exaggeration to state that the demands of labour, when they become uneconomic, are met at the expense of the community—the future tenants—whose houses tend to become ever inferior as these demands become ever more exacting. It is possible that a fuller realisation of this fact, namely, that, as the cost of labour rises—and it must be remembered that it rises not only with every increase in wages but with every diminution of output and every lowering of standards—the public immediately suffer by reason of the inferior article that they receive, labour would cease in maintaining its present entirely unreasonable attitude.

It is particularly unfortunate that this disaffection should occur in the building industry at the present time, when the machinery for the settlement of disputes and for amicable discussion and arbitration has been brought to such a high standard, and, moreover, the employers throughout have shown their willingness to make every concession so far as it is reasonably within their power to do so.

It is impossible to foresee to what *impasse* the present trend of events may lead. The unions possess the power to work good or evil, both for themselves and for the community—let us hope that they may yet choose the former course before it is too late.

"LUXURY" BUILDING.

CONSIDERABLE discussion took place at the meeting of the Coventry City Council last week, respecting the opposition of the Production Committee to the extension of bank premises for the London, Joint City and Midland Bank. The dimensions of the proposed new building are: frontage, 39 ft.; depth, 27 ft.; height to the eaves, 49 ft. from the pavement. The front of the building is to be constructed mainly of stone worked in quarries away from Coventry. It is estimated the work will occupy one year, and that the following workmen will be employed: Bricklayers, 2; masons, 4; carpenters, 4; joiners, 2; labourers, 10; plumber, 1; plasterers, 2; slaters, 2; the average number employed at any one time not exceeding 18. The fitting up of the interior of the building will be in walnut, which, it was claimed, could not possibly compete with work on any housing scheme the Council might have in view. Councillor F. Lee said the progress of the city should be considered, and in the interests of its extension they must not be obsessed with workmen's dwellings to the detriment of every other consideration. The assessable value of these premises would be increased, and consequently there would be increased revenue coming to the city. Councillor Bullock said there was a craftsmanship that built banks and a craftsmanship that built ordinary houses, and the labour engaged upon the bank would not be that engaged upon working-class houses. Councillor Read (Chairman of the Production Committee) said he would rather the Council took the responsibility of deciding the matter, and it was decided by a large majority that the recommendation of the Committee that work be prohibited be not adopted. The work will, therefore, be proceeded with.

BRITISH STANDARD SPECIFICATION FOR PORTLAND CEMENT.

A REVISED edition of the British Standard Specification for Portland Cement (Report No. 12–1920) has recently been issued by the British Engineering Standards Association. The present edition supersedes that published in 1915, its issue having been found necessary owing to the experience gained and improvements in manufacture effected since that date, and the altered conditions of storage now coming into existence.

The following are the principal modifications which have been made:—

(1).—A paragraph has been inserted making clear that no cement to which slag has been added, or which is a mixture of Portland cement and slag, will comply with the specification.

(2).—Provision has been made for sampling cement when stored in deep silos.

(3).—The specific gravity test has been eliminated.

(4).—The aeration of cement before testing for setting time has been dispensed with.

(5).—A provision has been inserted permitting the deduction from the total lime content of the proportion of lime necessary to combine with the sulphuric anhydride present when calculating the lime ratio.

(6).—The medium and slow-setting cements have been replaced by a grade having a minimum initial setting time of 20 minutes, and a maximum final setting time of 10 hours. The quick-setting cement which formed one of the three standard grades is retained in the specification, but is only to be supplied if specially required. A minimum final setting time is not now specified.

(7).—The clause relating to the supply by the vendor, free of cost, of a certificate that the cement has been tested and analysed and complies in all respects with the specification has been modified to provide that if such a certificate is required it must be so specified at the time of purchase.

The specification may be obtained from the offices of the British Engineering Standards Association, 28, Victoria-street, S.W. 1, or from the publishers, Messrs. Crosby Lockwood & Son, 7, Stationers' Hall Court, E.C. 4, price 1s. 2d. post free.

SCIENCE USEFUL TO THE PLASTERER AND CEMENT USER.—1.

PLASTERS.

How many plasterers or even those engaged in the sale and distribution of plasterers' materials have any knowledge of the composition of their "wares" or could explain why they set and harden? The plasterer will tell one that certain mixtures work well, and experience teaches him how his ingredients should be mixed and handled, and it is proposed to endeavour to add to his interest in and knowledge of his work by explaining some of the elementary principles which underlie his craft from a scientific standpoint. To deal first with plasters proper as distinguished from materials usually confined to mortars, fat lime plaster may first be taken as one of the oldest materials, still largely employed in three-coat work, though this material is not strictly recognised as a plaster by modern writers. When chalk is heated in a kiln it slowly decomposes, giving off a heavy invisible gas, known as carbon dioxide or carbonic acid gas, and leaving quicklime. This process takes place at a red heat and is most efficiently effected in a good current of air; indeed, if the products formed are allowed to cool down in contact a certain amount of recombination (*i.e.*, re-forming of chalk) may result. This quicklime has, as is well known, a great affinity for water, and, when fresh, "slakes" on the addition of water with the production of enough heat to convert some of the water into steam. If a limited quantity of water is added the lime falls to powder, but still remains solid, when it is known as "hydrated lime." Lime on hydration expands enormously and, of course, its value, weight for weight, compared with the unslaked material is very greatly less on account of this absorbed water. Every plasterer is well aware that lime which has been kept a long time unless stored in air-tight vessels slakes poorly and loses the "fat" properties which characterise the fresh material. All air, even the driest atmosphere, contains moisture which quicklime readily absorbs, but it also contains a small percentage of carbonic acid gas, which, by combining with the lime, converts it again into the original chalk. Though this change is very slow, it soon affects the working qualities of the material, which in time assumes the character of a poor or "lean" lime, or one insufficiently burnt. All plasterers will readily grant the difference in working qualities of the materials as above described, and we must now try to explain why the plaster which is formed from lime sets and hardens. To begin with, any finely divided solid when mixed with water and allowed to dry will usually "cake"—that is, its particles will stick together with more or less coherence. Ancient bricks were made of sun-dried clay and the mud walls used by many primitive races for their dwellings have no inconsiderable lasting powers. This cohesion is partly due to the entanglement of particles of different size, but may also be the result of the individual attraction which all bodies have for one another and which is displayed when these particles are very minute. At the same time, the great amount of swelling which occurs when lime takes up water no doubt assists in welding the formed plaster into a compact mass. There are, however, three other possible causes of setting and hardening, namely, the crystallisation of the slaked lime, the gradual formation of chalk by the action of the air, and the possible combination of a little of the sand used for plastering with the lime. This term "crystallisation" is so important in relation to all plasterers' materials that it deserves a word of explanation. Most solid substances except things of a glue-like nature tend to crystallise if given an opportunity. Thus, if sugar is melted in water and the water then allowed to evaporate by being slowly heated or merely exposed to the air, crystals of sugar are formed with which we are familiar; if, however, the water is rapidly boiled away the same sugar is left in a fine, powdery condition. In somewhat the same manner the powdery slaked lime which is formed by the sudden addition of water to quicklime can, by the addition of further water, be obtained, though not so readily, in crystallised form. Crystals vary in shape a great deal, and although a given substance always crystallises in some recognised way which enables it to be identified by experts, the variations even for an individual material are too great to make it possible for a practical man to hope to recognise these various shapes, although they undoubtedly affect the "setting" of materials. Some crystals are long and needle-shaped and, "growing" together, form a firmly interlocked mass; others are blunt and thick, but all have flat faces meeting at definite angles, and the strength of the material is, of course, influenced not only by the interlocking of the crystals, but by the strength—that is power to resist breaking—of the crystals themselves. Lime crystallises very gradually and generally in blunt, short crystals, but these undoubtedly after a time contribute to the strength—at best, however, very slight—of lime plaster.

To turn to the second cause of hardening—the air contains about one-twenty-fifth of one per cent. of carbonic acid gas, and this in the presence of moisture gradually acts on the lime, forming chalk again. This action is very slow and is incomplete after centuries; but it has its effect in hardening the material. Lastly, although it has never been satisfactorily proved, it seems probable that the sand used in plastering slowly combines with the lime to a very slight extent. We know that lime sand bricks can be formed, in which a lime silicate is formed; and we also know that sand is attacked by caustic substances, like lime and soda, though such action is only usually apparent at high temperatures and pressures.

The true plasters are composed mainly of sulphate of lime—a mineral found as a spar in certain sandstone beds and known as gypsum, or when in regular transparent crystals as "selinite." In this last form, it is frequently seen in the London clay, and is known as "petrified water" by the excavator. Now, the crystallising power of this material depends on its combination with water, which it contains—not as an absorbed liquid, as a sponge or a porous brick might contain it, but as a part of the solid material built up as a necessary feature of its structure. Water in this form is very common, though by no means universal in crystallised materials; and in this form is known as "water of crystallisation." All these water-containing bodies have one character in common, namely, that when heated to moderate temperature this water is driven off and the crystals lose their form and fall to powder. Generally, the water is given off in stages, so that by only heating the material to a certain temperature, though the shape of the crystal is lost, a definite quantity of the water—still in the solid form—is retained. All this may seem rather beyond the practical man, but it stands at the root of the employment of nearly all setting materials.

When gypsum is heated to a temperature not much above that of boiling water, it loses three-quarters of the twenty-two per cent. of water which it contains, and the residue when ground is known as "plaster of Paris." When this material is mixed with water, it quickly absorbs the amount of water of which it was previously deprived and forms crystals again; and if the water added is not too excessive this absorption results in the solidification of the whole mass This re-absorption of water accounts for nearly all setting effects; moreover, plaster of Paris, or dehydrated gypsum, in some less pure form is the essential ingredient of all true plasters, so that the setting of materials, such as separite plaster, Keene's, Parian, and other "cements" (wrongly so called) are to be explained in the same manner.

The reader may ask why, if these materials are so similar, such variations are found in their strengths and working qualities. Apart from the varying presence of inert ingredients, these substances contain small quantities of other chemicals which, though often not amounting to more than one or two per cent., exercise a very marked influence on their characteristics. Such bodies as borax and certain potash compounds intimately mixed with dehydrated gypsum confer remarkable properties in the matter of strength, while others produce considerable variations in the rate of setting and in working qualities. The true explanation of the action of these ingredients is still to be sought, and it is not proposed here to trouble the reader with various theories which have been put forward. Research is still wanted, and with our increased appreciation of science it is to be hoped that those controlling the plastering trades may take up these important problems which demand investigation that can hardly fail to be fruitful in its results. Much has yet to be learnt, for example, as to the effects of damp on plasters, and on the use of flooring plasters—about which very little is known in this country. A flooring plaster may be made by heating gypsum for a limited period to a temperature sufficient to remove the whole of its water of crystallisation. Ordinarily, this operation would leave the plaster what is termed "dead burnt," that is, useless, as being unable to again take up water and set; but, if properly conducted, the resulting burnt material when powdered will set slowly and form a very hard and coherent mass. As stated, the exact nature of the changes which produce these differences in quality are still obscure, but flooring plasters have long been used in Germany and might well receive more attention in this country.

THE NORWICH HOUSING & HOME-LIFE EXHIBITION.

THE Housing and Home-Life Exhibition now running in the Agricultural Hall, Norwich, is proving a great success. An attractive and unusual exhibit of drawings has been provided by local architects, showing various designs for houses ranging from the cottage type to the mansion. Among the building trade exhibits is that of Mr. F. R. Hipperson, Railway Works, Trowse, Norwich, who has provided actual specimens of buildings in brick, concrete and breeze blocks, and claims that substantial houses can be built from £500 upwards. A special feature of Mr. Hipperson's stand is the "Ultimatum" casement, which can be opened outside and inside, permitting every pane of glass to be cleaned from the inside. This patent casement is simple, fool-proof and cheap, and can be adapted to the best and cheapest forms of casement windows. It is to be made both in iron and wood, and top ventilation, which can be adjusted as desired, is provided. Messrs. W. Briggs & Sons, Ltd., are showing natural bitumen roofings and damp courses. Examples are shown as to the best method of using these materials, the outstanding properties being durability and impermeability to damp. The treatment of vertical damp courses is also dealt with and the various bituminous solutions of enamels manufactured by this Company are shown.

Local builders and manufacturers have responded well to the Ministry of Labour scheme for the training of ex-sailors and soldiers, and an interesting range of exhibits of work done by the trainees is on view. Messrs. Mann, Egerton & Co., Ltd., of Norwich are showing the "Willett" patent air gas plant and "Electolite" set, which is recommended for country mansions and can be worked by disabled men. Other exhibits represent lighting sets, and labour-saving appliances in the form of improved laundry machines, &c.

HOURS OF LABOUR AND OUTPUT.

THE annual report of the Chief Inspector of Factories and Workshops for the year 1919 contains a very interesting section on the effect of the fewer number of hours per week now generally worked in factories. When the production depends almost entirely on the speed of machinery the output has been found to be reduced in a proportion nearly, if not fully, corresponding to the reduction in hours. In other machine operations which call for constant alertness on the part of the operator, output has not suffered to this extent, and, in exceptional cases, has scarcely been affected at all. In a third class of process, where output is largely or entirely dependent upon the exertion of the worker, there is frequently no loss in production; in one wholesale tailoring establishment an increase of 40 per cent. is reported (partly due to re-organisation); while in a boot factory, where the hours of work were reduced from 52 to 48 per week, there is a considerable increase in output. Some of the reports indicate an unfavourable result in works where the shortening of hours has been followed by a reduction in the hourly rate of production.

Better time-keeping has been the result of discontinuing work before breakfast. There is also less absence for sickness and other reasons. In one large factory the average daily absentees numbered some years ago 40; now, with a 44-hour week, the average number of daily absentees has dropped to 10. In a large laundry the inspector reports there was a marked improvement in attendance, and not only less sickness, but fewer cases of absence for general reasons, such as attending to home affairs, the worker being better able to cope with these under the new hours of work. Less fatigue and overstrain are found in factories, and although more men are employed in the engineering and allied trades the accident list has not increased. Increased leisure has been utilised by many workers for the purposes of educational advancement. At a large engineering works until last year the hours worked were 54. Last year the 47-hour week was adopted. In this factory about 1,200 men and boys were employed before the change, and on the average at least 800 workers began as late as 9 a.m., instead of 6 a.m., once a week. In a typical week a few months ago only 18 half-days were lost by the present staff of 1,500 men and boys.

A Concrete Machine Demonstration.

The Liner Concrete (L.C.) Machinery Co., of Newcastle-on-Tyne, have arranged to demonstrate the "L.C." patent concrete machine in London from October 8 to 22. The "L.C." machine has been designed to make every stone required in the construction of houses. Architects, surveyors, contractors and others interested are invited personally to inspect the machine. Appointments may be arranged with Mr. James M. Mitchell, 110, Cannon-street, E.C. (Phone City, 4574), from whom further particulars may be obtained.

Building Trade Wages.

The District Conciliation Board (presided over by Mr. W. E. Collier, of Reading) met in London, on Tuesday this week, to consider the claim of the building trade operatives in the London area for an advance in wages to 3s. per hour for tradesmen and 2s. 9d. per hour for operatives. No settlement was reached, and it is understood that the claim will go before the National Conciliation Board.

Change of Address.

The address of Mr. A. L. Woodward, the inventor of the "Spade" system of shuttering for concrete house building (described in our issue for September 24) is now Ardmay Residential Hotel, Avenue Elmers, Surbiton.

RATES OF WAGES IN THE BUILDING TRADE.

THE following are the present rates of wages in the building trade in the principal towns of England and Wales. It must be understood that, while every endeavour is made to ensure accuracy, we cannot be responsible for errors that *may* occur:—

	Masons.	Bricklayers.	Carpenters, Joiners.	Plasterers.	Slaters.	Plumbers.	Painters.	Masons' Labourers.	Bricklayers' Labourers.	Plasterers' Labourers.
Aberdare	2/4	2/4	2/4	2/4	2/4	2/4	2/4			2/1
Accrington	2/4	2/4	2/4	2/4	2/4	2/4	2/4			2/0–2/0½
Altrincham	2/4	2/4	2/4	2/4	2/4	2/4	2/4			2/0–2/0½
Ashton-under-Lyne	2/4	2/4	2/4	2/4	2/4	2/5	2/4			2/0–2/0½
Barnsley	2/2½	2/2½	2/2½	2/2½	2/2½	2/2½	2/2½			1/11½
Barrow-in-Furness	2/4	2/4	2/4	2/4	2/4	2/4	2/4			2/0–2/0½
Barry	2/4	2/4	2/4	2/4	2/4	2/4	2/4			2/1
Bath	2/–	2/–	2/–	2/–	2/–	2/–	2/–			1/9
Bedford	2/–	2/–	2/–	2/–	2/–	2/–	2/–			1/9
Birkenhead	2/4	2/4	2/4	2/4	2/4	2/4	2/4			2/0½
Birmingham	2/4	2/4	2/4	2/4	2/4	2/5	2/4			2/1
Bishop Auckland	2/4	2/4	2/4	2/4	2/4	2/4	2/4			2/1
Blackburn	2/4	2/4	2/4	2/4	2/4	2/4	2/4			2/0–2/0½
Blackpool	2/4	2/4	2/4	2/4	2/4	2/4	2/4			2/0–2/0½
Bolton	2/4	2/4	2/4	2/4	2/4	2/3	2/4			2/0–2/0½
Bournemouth	2/–	2/–	2/–	2/–	2/–	2/–	2/–			1/9
Bradford	2/4	2/4	2/4	2/4	2/4	2/4	2/4			2/1
Bridgwater	1/10½	1/10½	1/10½	1/10½	1/10½	1/10½	1/10½			1/7½
Brighton	2/–	2/–	2/–	2/–	2/–	2/–	2/–			1/9
Bristol	2/2½	2/2½	2/2½	2/2½	2/2½	2/2½	2/2½			1/11½
Burnley	2/4	2/4	2/4	2/4	2/4	2/4	2/4			2/0–2/0½
Burton-on-Trent	2/2½	2/2½	2/2½	2/2½	2/2½	2/2½	2/2½			1/11½
Bury	2/4	2/4	2/4	2/4	2/4	2/4	2/4			2/0–2/0½
Cambridge	2/–	2/–	2/–	2/–	2/–	2/–	2/–			1/9
Cardiff	2/4	2/4	2/4	2/4	2/4	2/4	2/4			2/1
Chatham	1/11	1/11	1/11	1/11	1/11	1/11	1/11			1/8
Chelmsford	2/–	2/–	2/–	2/–	2/–	2/–	2/–			1/9
Cheltenham	2/–	2/–	2/–	2/–	2/–	2/–	2/–			1/9
Chester	2/2½	2/2½	2/2½	2/2½	2/2½	2/2½	2/2½			1/10½–1/11
Chesterfield	2/4	2/4	2/4	2/4	2/4	2/–	2/4			2/1
Colchester	1/11	1/11	1/11	1/11	1/11	1/11	1/11			1/8
Coventry	2/4	2/4	2/4	2/4	2/4	2/4	2/4			2/1
Crewe	2/2½	2/2½	2/2½	2/2½	2/2½	2/2½	2/2½			1/10½–1/11
Darlington	2/4	2/4	2/4	2/4	2/4	2/4	2/4			2/1
Derby	2/1	2/4	2/4	2/4	2/4	2/4	2/4			2/1
Doncaster	2/2½	2/2½	2/2½	2/2½	2/2½	2/2½	2/2½			1/11½
Dudley	2/2½	2/2½	2/2½	2/2½	2/2½	1/10½	2/2½			1/11½
Durham	2/4	2/4	2/4	2/4	2/4	2/4	2/4			2/1
East Glam. and Mon. Valleys	2/4	2/4	2/4	2/4	2/4	2/4	2/4			2/1
Exeter	2/–	2/–	2/–	2/–	2/–	2/–	2/–			1/11
Folkestone	1/11	1/11	1/11	1/11	1/11	1/11	1/11			1/9
Gloucester	2/–	2/–	2/–	2/–	2/–	2/–	2/–			1/8
Grantham	2/2½	2/2½	2/2½	2/2½	2/2½	2/2½	2/2½			1/9
Grays	2/4	2/4	2/4	2/4	2/4	2/4	2/4			1/11½
Grimsby	2/4	2/4	2/4	2/4	2/4	2/4½	2/3			2/1
Great Yarmouth	1/11	1/11	1/11	1/11	1/11	1/11	1/11			2/1
Guildford	1/11	1/11	1/11	1/11	1/11	1/11	1/11			1/8
Halifax	2/4	2/4	2/4	2/4	2/4	2/4	2/4			2/1
Harrogate	2/4	2/4	2/4	2/4	2/4	2/4	2/4			2/1
Hartlepools	2/4	2/4	2/4	2/4	2/4	2/4	2/4			2/1
Hastings	1/11	1/11	1/11	1/11	1/11	1/11	1/11			1/8
Hereford	2/–	2/–	2/–	2/–	2/–	2/–	2/–			1/9
Huddersfield	2/4	2/4	2/4	2/4	2/4	2/4	2/4			2/1
Hull	2/4	2/4	2/4	2/4	2/4	2/4	2/4			2/1
Ipswich	2/–	2/–	2/–	2/–	2/–	2/–	2/–			1/9
Lancaster	2/4	2/4	2/4	2/4	2/4	2/4	2/4			2/0–2/0½
Leamington Spa	2/2½	2/2½	2/2½	2/2½	2/2½	2/2½	2/2½			1/11½
Leeds	2/4	2/4	2/4	2/4	2/4	2/4	2/4			2/1
Leicester	2/4	2/4	2/4	2/4	2/4	2/4½	2/4			2/1
Lichfield	2/2½	2/2½	2/2½	2/2½	2/2½	2/2½	2/2½			1/11½
Lincoln	2/4	2/4	2/4	2/4	2/4	2/–	2/4			2/1
Liverpool	2/4	2/4	2/4	2/4	2/4	2/4	2/4			2/0½
Llanelly	2/4	2/4	2/4	2/4	2/4	2/4	2/4			2/1
London	2/4	2/4	2/4	2/4	—	2/4½	2/3			2/1
Loughborough	2/4	2/4	2/4	2/4	2/4	2/4½	2/4			2/1
Luton	2/–	2/–	2/–	2/–	2/–	2/–	2/–			1/9
Maidstone	1/11	1/11	1/11	1/11	1/11	2/3	2/4			1/8
Manchester	2/4	2/4	2/4	2/4	2/4	2/3	2/4			2/0–2/0½
Mansfield	2/2½	2/2½	2/2½	2/2½	2/2½	2/3	2/2½			1/11½
Merthyr Tydfil	2/4	2/4	2/4	2/4	2/4	2/4	2/4			2/1
Middlesbrough	2/4	2/4	2/4	2/4	2/4	2/4	2/4			2/1
Newcastle-on-Tyne	2/4	2/4	2/4	2/4	2/4	2/4	2/4			2/1
Newport, Mon.	2/4	2/4	2/4	2/4	2/4	2/4	2/4			2/1
Northampton	2/2½	2/2½	2/2½	2/2½	2/2½	2/2½	2/2½			1/11½
Norwich	2/–	2/–	2/–	2/–	2/–	2/–	2/–			1/9
Nottingham	2/4	2/4	2/4	2/4	2/4	2/4½	2/4			2/1
Oldham	2/4	2/4	2/4	2/4	2/4	2/4	2/4			2/0–2/0½
Oxford	2/–	2/–	2/–	2/–	2/–	2/–	2/–			1/9
Plymouth	2/1	2/1	2/1	2/1	2/1	2/1	2/–			1/10
Pontypridd	2/4	2/4	2/4	2/4	2/4	2/4	2/4			2/1
Portsmouth	2/–	2/–	2/–	2/–	2/–	2/–	2/–			1/9
Preston	2/4	2/4	2/4	2/4	2/4	2/4	2/4			2/0–2/0½
Reading	2/–	2/–	2/–	2/–	2/–	2/–	2/–			1/9
Rochdale	2/4	2/4	2/4	2/4	2/4	2/5	2/4			2/0–2/0½
Rochester	1/11	1/11	1/11	1/11	1/11	1/11	1/11			1/8
Rugby	2/2½	2/2½	2/2½	2/2½	2/2½	2/2½	2/2½			1/11½
St. Albans	2/–	2/–	2/–	2/–	2/–	2/–	2/–			1/8
St. Helen's	2/4	2/4	2/4	2/4	2/4	2/4	2/4			2/0–2/0½
Scarborough	2/2½	2/2½	2/2½	2/2½	2/2½	2/2½	2/2½			1/11½
Sheffield	2/4	2/4	2/4	2/4	2/4	2/4	2/4			2/1
Shrewsbury	2/2½	2/2½	2/2½	2/2½	2/2½	1/10½	2/2½			1/11½
Southampton	2/–	2/–	2/–	2/–	2/–	2/–	2/–			1/9
Southend-on-Sea	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½			1/9
Southport	2/4	2/4	2/4	2/4	2/4	2/–	2/4			2/0–2/0½
South Shields	2/4	2/4	2/4	2/4	2/4	2/4	2/4			2/1
Stockport	2/4	2/4	2/4	2/4	2/4	2/4	2/4			2/0–2/0½
Stockton-on-Tees	2/4	2/4	2/4	2/4	2/4	2/4	2/4			2/1
Stoke-on-Trent	2/2½	2/2½	2/2½	2/2½	2/2½	1/10½	2/2½			1/11½
Stroud	2/–	2/–	2/–	2/–	2/–	2/–	2/–			2/1
Sunderland	2/4	2/4	2/4	2/4	2/4	2/4	2/4			2/1
Swansea	2/–	2/–	2/–	2/–	2/–	2/–	2/–			1/9
Taunton	2/–	2/–	2/–	2/–	2/–	2/–	2/–			1/9
Torquay	2/–	2/–	2/–	2/–	2/–	2/–	2/–			1/9
Wakefield	2/4	2/4	2/4	2/4	2/4	2/4	2/4			2/1
Walsall	2/2½	2/2½	2/2½	2/2½	2/2½	2/3½	2/2½			1/11½
Warrington	2/4	2/4	2/4	2/4	2/4	2/4	2/4			2/0–2/0½
West Bromwich	2/4	2/4	2/4	2/4	2/4	2/4	2/4			2/1
Wigan	2/4	2/4	2/4	2/4	2/4	2/4	2/4			2/0–2/0½
Windsor	2/–	2/–	2/–	2/–	2/–	2/–	2/–			1/9
Wolverhampton	2/2½	2/2½	2/2½	2/2½	2/2½	2/2½	2/2½			1/10½
Worcester	2/2½	2/2½	2/2½	2/2½	2/2½	2/2½	2/2½			1/11½
York	2/2½	2/2½	2/2½	2/2½	2/2½	2/2½	2/2½			1/11½

CONTRACTS, COMPETITIONS, &c.

For some contracts still open, but not included in this List, see previous issues. Those with an asterisk (*)are advertised in this number. Contracts xxxii; Competitions iv; Public Appointments lxxxiv; Sales by Auction lxxxv.ii Certain conditions beyond those given in the following information are imposed in some cases such as that advertisers do not bind themselves to accept the lowest or any tender; that a fair wages clause shall be observed; that no allowance will be made for tenders; and that deposits are returned on receipt of a bona-fide tender unless stated to the contrary.

The date given at the commencement of each paragraph is the latest date when the tender, or the names of those willing to submit tenders, may be sent in; the name and address at the end is the person from whom or place where, quantities, forms of tender, &c., may be obtained.

BUILDING AND PAINTING.

OCTOBER 9.—**Glasgow.**—EXTENSION.—Extension of Municipal Buildings for the T.C. Messrs. Watson, Salmond & Gray, architects, 242, West George-street, Glasgow. Deposit £10.

OCTOBER 9.—**Kirkburton.**—COTTAGES.—Erection of 7 pairs of cottages at Storthes Hall Asylum, Kirkburton, near Huddersfield, for the West Riding Asylum Board. Mr. W. E. H. Burton, Architect, Asylums Board Office, Wakefield. Deposit £1.

OCTOBER 9.—**Ruthin.**—HOUSES.—Erection of eight workmen's dwellings at Rhewl, and two at Penfforddwr, for the R.D.C. Mr. S. A. Roberts, architect, Earl Chambers, Mold. Deposit £2 2s.

OCTOBER 9.—**Thames Ditton.**—HOUSES.—Erection of 40 houses at Greenwood Lodge Estate, Thames Ditton, for the Esher and the Dittons U.D.C. Mr. H. C. Fread, A.R.I.B.A., Architect, Council Offices Thames Ditton. Deposit £2 2s.

OCTOBER 11.—**Amersham.**—HOUSES.—Erection of houses on certain sites for the R.D.C. Messrs. Worthington, Healey & Grice, architects, 9, Grays Inn-square, W.C. 1.

OCTOBER 11.—**Birkenshaw.**—HOUSES.—Erection of 36 houses, for the U.D.C. Mr. Thomas Grayshon, surveyor, Birkenshaw.

OCTOBER 11.—**Chertsey.**—HOUSING SCHEME.—The U.D.C. invite tenders for 50 cottages, roads, drainage, &c., at Chertsey. Mr. W. W. Scott Moncrieff, F.R.I.B.A., architect, 11, Gray's Inn-place, W.C. 1. Deposit £2 2s.

OCTOBER 11.—**Crossgates.**—SCHOOL.—Erection of new school, Crossgates, for the Fife Education Authority. Mr. C. R. Douglas, surveyor, 15, East Port, Dunfermline. Deposit, £1 1s.

OCTOBER 11.—**Hampstead.**—REPAIRS, &C.—For sundry works, including the exterior painting and repairs to roofs, &c., at the New End Hospital of the Board of Guardians. Mr. H. Westbury Preston, Clerk to Guardians' Offices, New End, Hampstead. Deposit, £2 2s.

OCTOBER 11.—**Kirkwall.**—HOUSES.—Erection of 12 blocks, consisting of 18 three-apartment houses, and 6 five-apartment houses, for the T.C. Mr. W. J. Heddle, Town Clerk, Kirkwall. Deposit £1 1s.

OCTOBER 11.—**Truro.**—ADDITIONS.—Additions to 4 and 5, King-street, for Miss Manuell. Mr. A. G. Cornelius, architect, Truro.

OCTOBER 12.—**Birkenhead.**—HOME.—Erection of a new Central Receiving Home for Children in Wood church-lane, Birkenhead, for the Board of Guardians. Mr. A. Ernest Shennan, M.S.A., 35, Dale-street, Liverpool.

OCTOBER 12.—**Cwmamman.**—HOUSES.—Erection of 58 houses for the U.D.C. Mr. Gilbert Davies, architect, Bronwydd, Garnant. Deposit, £3 3s.

OCTOBER 12.—**Glossop.**—ALTERATIONS, &C.—For alterations and additions to buildings and providing and fitting modern steam cooking apparatus, for the Board of Guardians. Mr. Chas. E. V. Fenton, Clerk, Poor Law Offices, Glossop.

OCTOBER 12.—**Kent.**—HOUSES.—Erection of houses for the Kent C.C., for housing police, viz.: (a) one pair at Street End, Luton, Chatham; (b) one pair at Palmerston-road, Chatham; (c) one pair at Corkwell-road, Chatham; (d) one pair at Luton-road, Chatham; and (e) two pairs at Balfour-road, Rochester. Mr. F. W. Ruck, County Architect, 86, Week-street, Maidstone

OCTOBER 12.—**Llandaff.**—HOUSES.—Erection of 10 houses in Taff-terrace, Radyr, for the R.D.C. Mr. William Farrow, engineer, Park House 20, Park-place, Cardiff. Deposit £3 3s.

OCTOBER 12.—**Salford.**—HOUSES.—Erection of 306 houses, for the T.C. Mr. G Westcott, architect, 13, Bridge-street, Manchester.

OCTOBER 12.—**Sandwich.**—PAINTING, &C.—Outside painting and repairs at Sandwich Police Station. Mr. F. W. Ruck, County Architect, 86, Week-street, Maidstone.

OCTOBER 13.—**Benfieldside.**—HOUSES.—Erection of 168 houses of various types, for the U.D.C. Surveyor, Council Offices, Blackhill. Deposit, £1 1s.

OCTOBER 13.—**Gosforth.**—HOUSES.—Erection of 28 semi-detached houses for the U.D.C. Mr. George Nelson, Surveyor, Council Offices, Gosforth.

OCTOBER 13.—**Peebles.**—HOUSES.—Erection of seven blocks of two double-storey cottages and three blocks of two double-story cottages, for the T.C. Mr. James D. Cairns, 63, George-street, Edinburgh.

OCTOBER 13.—**Wandsworth, S.W.**—PAINTING, &C.—(a) Painting works at St. John's Hill Infirmary; (b) Painting and alterations at Union Offices, St. John's Hill, for the Guardians.

*OCTOBER 14.—**Eton.**—HOUSES.—Erection of houses in certain parishes; also for roads, sewers, &c., in connection with the Council's housing scheme. Mr. Arthur Gladwell, Director of Housing, 160, High-street, Slough. Deposit £2 2s.

OCTOBER 14.—**London, N.**—BUILDING.—Conversion of Queen's Mansions, North-road, Islington, to provide 47 self-contained flats, &c., for the B.C. Mr. E. C. P. Monson, F.R.I.B.A., architect, Finsbury Pavement House, E.C.2. Deposit £2.

OCTOBER 14.—**Southampton.**—HOUSES.—Erection of several blocks of houses, for the T.C. Borough Engineer, Southampton.

OCTOBER 15.—**Belfast.**—HOUSES.—Erection of dwellings at Cherryvalley (Knock District) and Dundela (Sydenham District). Messrs. W. H. Stephens & Sons, architects, 13, Donegall-square North, Belfast. Deposit, £5 5s.

OCTOBER 15.—**Catterick.**—WORKS.—War department contracts for repairs and materials in the Catterick district. A. Brooksbank, Major, R.E., Commanding Royal Engineers, Catterick District, Engineer Office, Catterick.

OCTOBER 15.—**Denbigh.**—HOUSES.—Erection of 24 houses, for the T.C. Mr. James Hughes, architect, Denbigh. Deposit, £2 2s.

OCTOBER 16.—**Auckland.**—HOUSES.—Erection of 54 houses at West Auckland, for the Auckland R.D.C. Deposit £2 2s.

OCTOBER 16.—**Canterbury.**—COTTAGES.—Erection of two pairs of cottages at the Kent County Mental Hospital, Chartham Downs, near Canterbury. Mr. W. J. Jennings, architect, 4, St. Margaret's-street, Canterbury. Deposit, £2.

OCTOBER 16.—**Culross.**—HOUSES.—Erection of 10 houses at Playfield Site, Balgownie, for the T.C. Mr. H. H. Motion, architect, Union Bank Chambers, Dunfermline. Deposit, £1 1s.

OCTOBER 16.—**Reigate.**—HOUSES.—Erection of houses at: South Nutfield, 16; Horley, 20; and Betchworth, 8, for the R.D.C. Quantities of the architects, viz., South Nutfield and Horley, Messrs. T. R. & V. Hooper, Market Hall Buildings, Redhill; Betchworth, Mr. D. J. Barry, 50, High-street, Reigate. Deposit £2 2s.

OCTOBER 18.—**Altrincham.**—HOUSES.—Erection of 30 houses for the U.D.C. Mr. H. E. Brown, Surveyor, Town Hall, Altrincham. Deposit, £2 2s.

OCTOBER 18.—**Aspatria.**—HOUSES.—Erection of 60 houses, including all road making, excavating, and sewers, for the U.D.C. Mr. H. Eldfield, architect, Workington.

OCTOBER 18.—**Barry.**—HOUSES.—Erection of 52 houses, together with roads and sewers, for the Barry Garden Suburb, Ltd., South Wales. Mr. T. Alwyn Lloyd, F.R.I.B.A., Architect to the Welsh Town-Planning and Housing Trust, Ltd., 6, Cathedral-road, Cardiff. Deposit £3 3s.

OCTOBER 18.—**Denny.**—HOUSES.—Erection of houses, &c., for the T.C. Mr. James Strang, Architect, Falkirk.

OCTOBER 18.—**Port St. Mary.**—LAVATORIES.—For erection of public lavatories, for the Commissioners. Mr. R. A. Collister, Clerk, Port St. Mary.

OCTOBER 19.—**London.**—HEADSTONES.—The Imperial War Graves Commission invite tenders for a total supply of 7,400 headstones. Secretary (Works Branch), Imperial War Graves Commission, 33–38, Baker-street, London W. 1.

OCTOBER 20.—**Farnborough, Hants.**—HOUSES.—Erection of 12 houses (in blocks of 6) on Queen's-road site, for the U.D.C. Mr. John A. Kingdon, Clerk to the Council, Town Hall, Farnborough, Hants.

OCTOBER 20.—**Long Sutton.**—HOUSES.—Erection of five pairs of houses on the Bridge-road, and four pairs in the Delph-road, for the U.D.C. Mr. F. Burdett Ward, architect, at 8, South Brink Wisbech.

*OCTOBER 20.—**Manchester.**—COMPLETION OF SCHOOL.—Completion of the Orford-street Municipal School, Cheetham, Manchester, for the E.C. Deposit, £1 1s.

OCTOBER 20.—**Norwich.**—HOUSES—Erection of 209 houses on the Mile Cross Estate, for the Corporation. Mr. S. G. Livock, architect, 128, Unthank-road, Norwich (for 64 houses): Messrs. A. F. Scott & Sons architects, 24, Castle Meadow, Norwich, (for 56 houses); Mr. G. J. Skipper, architect, 7, London-street, Norwich (for 46 houses); Mr. S. J. Wearing, architect, 3, Redwell-street, Norwich (for 43 houses).

*OCTOBER 22.—**West Ashford.**—HOUSES.—Erection of the first 28 houses under the West Ashford R.D.C. Housing Scheme. Mrs. Edwin A. Jackson, architect, Ashford, Kent.

*OCTOBER 23.—**Bromborough.**—HOUSES.—Erection of 12 houses (Type "A") and 4 houses (Type "B"), for the U.D.C. Messrs. John Clarke & Son, Architects 34, Castle-street, Liverpool. Deposit £2 2s.

OCTOBER 24.—**Stepney.**—PAINTING.—For interior painting and distempering, also building work at the Institution, St. Leonard's-street, Bromley-by-Bow, for the Board of Guardians. Mr. A. J. Smith, Clerk to Guardians' Offices, Barnes-street, Stepney, E. 14. Deposit, £2 2s.

OCTOBER 25.—**Gainsborough.**—HOUSES.—Erection of about 100 houses on the Cattle Market site. Mr. E. G. Allen F.R.I.B.A., architect, 4, Arundel-street, W.C.2. Deposit £2 2s.

*OCTOBER 25.—**Stevenage.**—COTTAGES.—Erection of 16 cottages in Walkern-road, Stevenage, for the U.D.C. Deposit £2 2s.

OCTOBER 26.—**Handsworth.**—HOUSES.—Erection of 12 pairs of houses on the Stubbin-lane site, Woodhouse, for the U.D.C. Messrs. Creswick & Son, 9, East Parade, Sheffield.

*OCTOBER 28.—**London, E.**—REDECORATION, &C.—For redecoration work and general repairs at their Infirmary Nurses' Home, Raine-street, E. 1, for the Guardians of St. George-in-the-East.

*NOVEMBER 1.—**Slough.**—HOUSES.—Erection of houses of various types for the U.D.C. Mr. Alan Bromly, Architect to the Council, 4, William-street, Slough.

*NOVEMBER 3.—**London, W.**—BUILDING WORKS.—For (a) reconstruction of an existing building into a Nurse's Home; (b) erection of Operating Theatre on Central Corridor; (c) making a new roadway at their Infirmary, 285, Harrow-road, W., for the Paddington Guardians. Mr. H. Percy Adams, F.R.I.B.A., architect, 28, Woburn-place, W.C. 1. Deposit, £5.

NO DATE.—**Dunbarton.**—HOUSES.—Erection of 40 blocks of 104 houses at Alexandria, and 15 blocks of 44 houses at Renton, for the County Council. Mr. Joseph Weekes, architect, 201, Bath-street, Glasgow. Deposit, £1 1s.

FURNITURE, MATERIALS, etc.

OCTOBER 9.—**Bedlingtonshire.**—ROAD MATERIALS.—Supply of hand-broken road Whinstone, for the U.D.C. Mr. J. E. Johnston, surveyor, Bedlington.

OCTOBER 12.—**Lambeth.**—MATERIALS.—Supply of (a) 250 tons of Portland cement and (b) sewer castings, to the B.C. Mr. H. E. Anderson, Borough Engineer, Lambeth Town Hall, Brixton Hill, S.W.

OCTOBER 12.—**London.**—CRANES.—Supply of pillar water cranes to the Secretary of State for India. Director-General of Stores, India Office, Whitehall, S. W. 1.

OCTOBER 15.—**Darlington.**—MATERIALS.—For supply of various road and other materials, for the T.C. Borough Surveyor, Town Hall, Darlington.

OCTOBER 23.—**Glasgow.**—MATERIALS.—Supply of various materials for 12 months to the Board of Guardians. Mr. J. R. Motion, Clerk, 266, George-street, Glasgow

ENGINEERING, IRON AND STEEL.

OCTOBER 12.—**Bangor.**—PIER.—Reconstruction of damaged portion of pier, etc., for the T.C. Mr. H. Pritchard, Consulting Engineer, Cal Gwyn, Port Dinorwic, N.W.

OCTOBER 12.—**Durban.**—SLUICE GATES.—**Supply and erection of two large reservoir sluice gates, each 30 ft. by 11 ft., with appurtenances, at Camperdown Reservoir, Durban, for the T.C. Messrs. Webster, Steel & Co., 5, East India-avenue, E.C.**

OCTOBER 12.—**London.**—COPPER WIRE.—Supply of hard-drawn copper wire for telegraphs, for the Secretary of State for India. Director-General of Stores, India Office, Whitehall, S.W. 1.

OCTOBER 12.—**Newbury.**—PUMPING SCHEME.—Schemes and tenders for alternative method of supplying power for pumping sewage. Mr. S. V. L. Vincent, Borough Surveyor, Newbury.

OCTOBER 27.—**Manchester.**—HEATING INSTALLATION.—Erection at the Barton Power Station, Trafford Park, of complete heating installation for the workshop and stores, for the T.C. Mr. F. E. Hughes, Secretary, Electricity Department, Town Hall, Manchester. Mr. S. L. Pearce, Manager, Dickinson-street, Manchester.

OCTOBER 28.—**Bradford.**—COOLING TOWERS.—ETC.—Supply and erection of following:—Two natural draught chimney type cooling towers, pipe work, troughing valves, &c. Mr. Thomas Roles, City Electrical Engineer, Electricity Offices, Town Hall, Bradford. Deposit £1 1s.

NOVEMBER 3.—**Belfast.**—WATERWORKS.—Construction of the "Silent Valley" storage reservoir, &c., in the Mourne Mountains, County Down, for the T.C. Mr. W. I. Quinn, Secretary, Water Office, Royal-avenue, Belfast. Deposit £5 5s.

NOVEMBER 16.—**Wallasey.**—VARIOUS WORKS AND SUPPLIES.—The Corporation Gas and Water Department invite tenders for a Lancashire boiler, railway metals, creosoted sleepers, and for the construction of two branch railway sidings. Mr. J. H. Crowther, Engineer, Gas Works, Wallasey.

NOVEMBER 30.—**Bristol.**—DOCK.—**The Bristol Docks Committee invite tenders for the lease of its dry dock on the floating harbour, near Cumberland-road, subject to the conditions that the lessee shall undertake the restoration and improvement of the dock (including the provision of a new caisson). Chief Engineer, Avonmouth Docks, Bristol.**

ROAD, SANITARY, AND WATER WORKS.

OCTOBER 11.—**Alnwick.**—SEWER.—Construction of sewer at High Newton-by-the-Sea for the R.D.C. Clerk, Council Offices, Alnwick.

OCTOBER 11.—**Altrincham.**—ROADS.—Making up of Ellesmere-road, Gaskell-road, Hazel-road, Colwick-avenue, and Ashton-avenue, for the U.D.C. Mr. H. B. Brown, Town Hall, Altrincham.

OCTOBER 11.—**Birkenshaw.**—ROADS, &C.—Street making, sewering and drainage required in connection with housing scheme of the U.D.C. Mr. Thomas Grayshon, Surveyor, Birkenshaw.

OCTOBER 11.—**Lymington.**—DRAINS, &C.—For sewers, &c., in connection with the first part of housing scheme, for the T.C. Mr. John Bevir architect, St. Thomas's-street Lymington. Deposit, £1 1s.

OCTOBER 11.—**Mountain Ash.**—ROADS.—Construction of roads, sewers, &c., in connection with housing scheme, of the U.D.C. Mr. W. G. Thomas Surveyor, Town Hall, Mountain Ash. Deposit £2 2s.

OCTOBER 11.—**Prestwich.**—ROADS.—Construction of roads on the housing estate, for the U.D.C. Mr. S. H. Morgan, Surveyor, Town Hall, Prestwich. Deposit, £2 2s.

OCTOBER 12.—**Adwick-le-Street.**—ROADS, &c.—Making up roads, sewers, &c., in connection with housing schemes of the U.D.C. Mr. G. Gledhill, surveyor, Adwick-le-Street.

OCTOBER 12.—**South Shields.**—SEWERS, &C.—Laying the sewers, &c., in connection with housing scheme at Whitburn, for the R.D.C. Surveyor Council Depot, East Boldon.

OCTOBER 14.—**Liverpool.**—BATH, &c.—Alterations in bath and lavatory accommodation, at Institution, for the Board of Guardians. Mr. G. W. Coster, Clerk, Parish Offices, Liverpool.

OCTOBER 18.—**Lymm.**—SANITARY.—Conversion of eleven privies into water closets, for the U.D.C. Further particulars, Surveyor, Council Offices, Lymm.

Auction Sales, Tenders, &c.

OCTOBER 12 AND 13.—**Brentwood.**—Mr. H. W. Smith will sell, at the Yard, in King's-road, Brentwood, the extensive stock, plant and effects of a builder's merchants and undertaker by order of the executors of Mr. Joseph Winter, deceased.

OCTOBER 12. — **Greenford, Middlesex.**—Messrs. Bradshaw Brown & Co. will sell by direction of the Disposal Board, Ministry of Munitions (Plant and Machinery Section), plant and machinery at C.S. Depot, 93, Greenford, Middlesex.

OCTOBER 13.—**London, S.W.**—Messrs. Geo. Trollope & Sons will sell, at Winchester House E.C., the freehold property situate 130, Brompton-road, and Nos. 2, 4, 6, 8, Montpelier-street, S.W. Auctioneers, West Halkin-street, Belgrave-square, S.W.1.

OCTOBER 14.—**Hanover-square.**—Messrs. Knight, Frank & Rutley will sell a freehold island estate situate Euston-road, at the Hanover Estate Room. Auctioneers, 20, Hanover-square, W. 1.

OCTOBER 14.—**Kennington.**—Messrs. Knight, Frank & Rutley will sell by direction of the Council of H.R.H. the Prince of Wales, K.G., the Freehold Estate extending to about 8 acres, being a portion of the Duchy of Cornwall Estate at Kennington. Auctioneers, 20 Hanover-square, W.1.

✱OCTOBER 14.—**Norwich.**—Messrs. Hooker & Rogers will sell, in suitable lots, the historic seat of the late Lord Stafford (Costessy Hall), comprising the magnificent pile of fifteenth century and modern buildings, about four miles from Norwich.

OCTOBER 18.—**Hendon.**—Messrs. Knight, Frank & Rutley will sell (unless previously disposed of), freehold residence known as "Myles Down," comprising 2½ acres; also pasture and building land. Auctioneers, 20, Hanover-square, W. 1.

✱OCTOBER 18.—**Newmarket.**—Messrs. Wilson & Co. will sell at "Cheveley Park," Newmarket, a large quantity of electric fittings, &c.

✱OCTOBER 19.—**London, S.W.**—Messrs. Veryard & Yates will sell at 816 and 818, Garratt-lane, Tooting Broadway, S.W., valuable plant and machinery.

✱OCTOBER 19.—**Purfleet.**—Mrs. Edward R. Porter will sell, by direction of the Disposal Board, Ministry of Munitions (Furniture Section), a large quantity of army surplus furniture and effects at "D" Lines, Purfleet Camp, Essex.

OCTOBER 20.— **Croydon.**—Messrs. J. T. Skelding & Co. will sell imported timber and building materials, army huts, &c., on land adjoining the New Croydon Foundry, Waddon Marsh-lane, Croydon.

NO DATE.—**London, W.C.**—Messrs. Leopold Farmer & Sons will sell at an early date a quantity of timber scaffold poles, &c., at 4, 6, and 8, Newton-street Holborn, W.C.

Competitions.

(*See Competition News, page* 395.)

Public Appointments.

OCTOBER 11.—**Hebburn.**—CLERK OF WORKS.—Clerk of Works required by the U.D.C. to supervise erection of 241 houses. Mr. H. Paterson, Surveyor, Council Office. Hebburn.

OCTOBER 11.—**London, N.**—ASSISTANT LECTURER.—An Assistant Lecturer is required by the Governors of the Northern Polytechnic Institute, Holloway, N.7. in their School of Architecture, Surveying and Building.

✱OCTOBER 11.—**Scunthorpe.**—CLERK OF WORKS.—Clerk of Works required by the Scunthorpe and Fredingham U.D.C., for their housing scheme.

✱OCTOBER 11.—**Witham.**—SURVEYOR'S ASSISTANT.—Surveyor's Assistant required by the U.D.C.

OCTOBER 11.—**Workington.**—ARCHITECTURAL ASSISTANT.—Temporary Architectural Assistant required by the Corporation (Borough Engineer and Surveyor's Department).

OCTOBER 12.—**Durham.**—CLERK OF WORKS—Clerk of Works required in the Architectural Department of the C.C.

✱OCTOBER 12. — **Leicester.** — ARCHITECTURAL ASSISTANT.—Architectural Assistant required by the Corporation in the Housing Department. Salary £300 per annum. Mr. E. Geo. Mawbey, M.Inst.C.E., City Engineer and Surveyor, Town Hall, Leicester.

OCTOBER 13.—**London, S.E.**—CLERK OF WORKS.—Lewisham B.C. require a Clerk of Works for the erection of 86 houses on the Lewisham Park site. Salary £8 per week.

✱OCTOBER 18.—**Bilston.**—VARIOUS APPOINTMENTS.—The U.D.C. invite applications for the following appointments:—Housing Dept.: Assistant Manager and Collector; Works Cost Clerk; Assistant Clerk of Works. Engineering Dept.: Junior Engineering Assistant.

✱OCTOBER 20.—**Whitley Bay.**—CLERK OF WORKS.—Clerk of Works required by the Whitley and Monkseaton U.D.C., for their housing scheme. Salary £7.

✱OCTOBER 29.—**South Africa.**—QUANTITY SURVEYORS.—Fully-qualified Quantity Surveyors and Quantity Surveyor's Assistants required by the Government of the Union of South Africa, Department of Public Works.

✱NO DATE.—**Friern Barnet.**—CLERKS OF WORKS.—The U.D.C. require 2 Clerks of Works for housing scheme on 2 sites.

PROPOSED NEW BUILDINGS AND OTHER WORKS.*

In these lists care is taken to ensure the accuracy of the information given, but it may occasionally happen that, owing to building owners taking the responsibility of commencing work before plans are finally approved by the local authorities, "proposed" works, at the time of publication, have been actually commenced. Abbreviations:—T.C. for Town Council; U.D.C. for Urban District Council; R.D.C. for Rural District Council; E.C. for Education Committee; B.G. for Board of Guardians; L.C.C. for London County Council; B.C. for Borough Council; and P.C. for Parish Council.

ANFIELD PLAIN.—Plans passed: Wash-house at Queen's Head Hotel, Annfield Plain, for the Newcastle Breweries Co., Ltd.; re-construction of Co-operative Stores at Dipton, for the Annfield Plain Co-operative Society.

BARNES.—Plans passed by U.D.C.:—House, Sheen Common Drive, for Mr. H. C. Mordaunt Roll; garage, 48, Coval-road, for Mr. W. J. Short; house, Vine-road, Barnes, for Cox, Taylor & Horton; four houses, Gordon-avenue, Mortlake, by Mr. A. Basden; garage and flat over "Holmhurst," Upper Richmond-road, Barnes, for Percy M. Clarke & Son; alterations and new observatory, 34, The Crescent, Barnes, for Mr. F. C. Cole; conservatory, &c., 19, Hillersdon-avenue, Barnes, for Mr. W. Nichols; Conversion of house into flats, 5, Northumberland-avenue, Barnes, for Mr. M. Skinner.

BATH.—Plans approved: Additional room, rear of Ormonde Lodge, 30, Sion-hill; alterations, 1, Lower Borough Walls; motor shed, Combe Cottage, Combe Down; alterations, Beau Nash Picture House, Westgate-street; bathroom, &c., 12, George-street.

BATTERSEA.—Factory: Southampton Wharf, York-place, Holliday & Greenwood, for Garton, Sons & Co.; additions, 8, St. John's-hill, Mr. J. H. Storrar, for Sam Isaacs, Ltd.

BEDDINGTON AND WALLINGTON.—Plans passed by the U.D.C.:—Bungalow, Wordsworth-road, Wallington, for Gale & Cobb, 14A, Lydden-grove, Wandsworth; bungalow, Woodcote-road, Wallington, for Mr. H. S. Skinner, 9, Cameron-road, Croydon; eight houses, Sandy-lane South, Wallington, for the Woodcote Public Utility Society; bungalow, Sandy-lane South, Beddington, for Mr. J. H. Wright, 16, Wordsworth-road, Wallington; house, Plough-lane South, Beddington, for Mr. S. J. Hollands, "Four-Went-Waye," Stafford-road, Beddington; boiler house, Richmond-road, Beddington, for Messrs. Lacy, Hulbert & Co., Boreas Works, Richmond-road, Beddington; timber house, Croydon-road, Beddington, for Messrs. Harrods, Ltd., Brompton-road, S.W.; motor garage, Heathdene-road, Wallington, for Mr. W. T. Guthrie, "Heatherwood," Heathdene-road, Wallington; bungalow, Woodcote-road, Wallington, for Mr. John Skinner, 9, Cameron-road, West Croydon; two houses, Lavender Vale, Wallington, for Messrs. Claridge & Son, 105, Stafford-road, Wallington.

BETHNAL GREEN.—Drainage application granted: At 13A, Turin-street, E.2, by Lovegrove & Papworth; 2, Viaduct-street, E.2, by T. J. Cock & Son; the "Lawrence" L.C.C. School, Mansford-street, by C. P. Roberts & Co., Ltd.

BRIGHTON.—Mr. R. M. Phillips, of Conduit-street, London, W., has purchased the Devil's Dyke and states that it is the intention to develop a town there. Two hundred houses are to be built.

CAMBERWELL.—Drainage plans passed by B.C.: For 130 houses and 24 flats on the Casino House estate, for Sir F. Baines and for 78 houses and 8 flats on the housing estate, Hawkshide-road, &c., for 10 houses at East Dulwich Grove for Mr. Williams; at Ivy Laundry, 50A, Peckham Rye for Messrs. Fuller & Griffin.

CHESTERFIELD.—Councillor Eastwood has offered to provide a site for a technical school, and also to give £25,000 towards the cost of erection.

COATBRIDGE.—The Dean of Guild Court has passed plans for the erection of 226 houses at Coatdyke at an estimated cost of a quarter of a million. This is the first instalment of the Council's housing scheme.

EAST HAM.—Plans passed: Alteration, Palace Cafe, High-street North, for Mr. Randolph; offices and store, 42–46, Heigham-road, for the Boddy Life Savings Appliances, Ltd.; four houses and doctor's residence, Beckton-road, for the Gas Light & Coke Co.; steel framed building, 85 Plashet-grove, for Messrs. E. & A. Hacker; dairy, 477–9, Katherine-road, for Mr. J. Mortlock; alterations to shop, 251–253, High-street North, for Messrs. T. Jay Evans & Son.

ETON.—Plans passed by R.D.C.: Bungalow, Mopes Farm, Denham, for Mrs. E. E. Bewes; house, Station-road, Gerrards Cross, for Mr. E. H. Burgess; additions to "The Grange," at Farnham Common, for Mr. B. B. Van Praagh; bathroom to bailiff's house, at "The Chase," for Mr. J. C. Berry; two bungalows at Wraysbury, for Mr. A. H. Wood; bungalow in Oval Way, Gerrards Cross, for Miss Streatfield; re-building of back of lodges at "The Chase," Farnham Royal, for Mr. J. C. Berry; bungalow at Boveney, for Mr. A. E. Haines; bungalow and garage in Staines-road, Wraysbury, for Mr. Perryman; additions to Milbourne Cottages, Denham, for Mr. F. Bacon.

HAMMERSMITH.—Drainage plans passed by B.C.: At Hadyn Park Works, Hadyn Park-road, for Miskin & Son; at White City, for Marchant, Hurst & Co. at 52, Stamford Brook-road, for J. E. M. Macgregor; at 5, Richmond-road, for The Economic House Drainage Co., Ltd.; at 9, Richford-street, for S. H. Hirst; at Signal Box, G.W. Rly., Ducane-road, for W. L. Monckton; at 57, King-street, for A. Pascall & Son; at 4, Paradise-row, for W. I. Burns; at 69, Greenside-road, for A. Heywood; at Labour Exchange, Leysfield-road, for H. M. Hopwood; at 1, Grove-mews, for H. Turner; at Railway Approach, Goldhawk-road, for J. Mowlem & Co., Ltd.; at The Maltings, King-street, for W. Humfrey; at 7, Richford-street, for S. Hirst.

ILFORD.—Plans passed by U.D.C.: Mr. F. Willmott, 29, Park-avenue, house, 33, Park-avenue; Mr. A. P. Griggs, 21 houses, Nos. 56-96, St. Andrews-road; Messrs. J. Lowe & Co., alterations to shop, No. 139, Ley-street; Mr. A. E. Russell, alterations to house and new stable, 282-284, Ley-street; Mr. A. E. Stickland, 52, Britannia-road, Ilford; recreation room for Ilford Methodist Church, Ilford-lane; Mr. E. Topham Forrest, L.C.C., Lay-out plans for Dagenham Estate.

OKEHAMPTON.—Plans for seven houses in High-street presented by W. Ball & Son, in Station-road, by Messrs. J. J. Sleeman & Son, of Okehampton, and two houses in Mill-lane by Messrs. Blatchford & Co., have been passed by the T.C.

POPLAR.—Messrs. Harris & Wardrop, garage, 235 and 237, Old Ford-road; Messrs. A. Roberts & Co., superintendent's house at Lock House, Parnell-road Messrs. Harris & Wardrop, additions to J. Compton's Clothing factory, Old Ford-road.

PRESTON.—Plans passed: Mr. J. J. Pearson, for Mr. W. Sergeant, alterations to house, Selborne-street; Mr. P. H. Shepperd, alterations and additions, Fishergate; Mr. H. Whittle, garage, Mulgrave-avenue; Messrs. Garlick & Sykes, for Mr. John Newton, garage, Heaton-road; Mr. J. T. Henshaw, extensions, Heald Works, Peel Hall-street; Mr. A. C. M. Lillie, massage room, Royal Infirmary, Stanleyfield-road; Mr. John Hayhurst, alterations, Ashton Labour Representation Club, 10, Tulketh Brow; Messrs. Andrew & Dickson, alterations and additions, Main Sprit Weind; Mr. M. Bagot, garage, Waterloo-road; Mr. E. J. Andrew, workshops, Ribbleton-avenue; Mr. J. Masheter, bungalow, Melling's Fold; Mr. A. J. T. Ellison, alterations, &c., 87, Fishergate; Mr. J. Baron, packing shed, 296, North-road; Messrs. T. Hodgkinson & Sons, workshops, Dock Lands off Strand-road; Mr. Wm. Houghton, bungalow, Moorside Farm, Ribbleton; Messrs. J. H. & W. Mangan, alterations, Orchard-street; Messrs. Thos. Blackburn & Sons, alterations to streets, Isherwood-street and Dodgson-road.

RHYL.—The war memorial is to take the form of a hospital. Plans have been accepted and the land secured. It is estimated that £10,000 will be required.

RUGBY.—Pair of villas, Poplar-grove, for Mr. W. H. Taplin.

SCARBOROUGH.—A big scheme, estimated to cost about £150,000, is expected to materialise in connection with improvements to the Spa. The suggested improvements include the rebuilding of the Grand Hall and reseating it like a theatre, and erecting a dance hall on the balcony over the shops at the north end of the Spa. The shops will be brought forward to the present flower beds. A lift is to be provided to run from the South Cliff down into the present picture gallery, whilst the piece of ground immediately between the South Cliff tramway and the toll-house is to be taken into the present promenade with a view to providing fresh seating.

SOUTHEND-ON-SEA.—Plans passed: House and garage, Chadwick-road, for Mr. J. H. Waterhouse; conservatory, 180, Westborough-road, for Mr. F. G. Harris; garage, Walton-road, for Mr. W. Oley; additions, "Beeleigh," South-avenue, for Mr. C. Wisbey; alterations and additions, "Bellaville," Heygate-avenue, for Mrs. A. Byers; combined drainage, Southbourne-grove, for G. Matthew and P. Ginham; conservatory, 12, Westminster Dr., for Mr. Lane; garage, Burges-road, for C. Matthews; 2 houses, Thorpe Hall-avenue, for Mr. E. Rapkin; drainage, Southbourne-grove, for Messrs. Goodwin & Clements; conversion of school into house, Church-hill; Leigh, for Mr. W. G. Beecroft; garage, Southbourne-grove, for Mr. J. French; 2 houses, Eastwoodbury, for Essex County Council Small Holding Committee; bathroom additions, White Cottage, Electric-avenue, for Mr. A. H. Holmes; garage, Southbourne-grove, for Mr. W. Enever; drainage of two bungalows, Fleming-avenue, for Mr. R. H. Pennell; alterations and additions, Herschell-road, for Mr. G. W. Greaser; w.c. and store, "Cambral," Percy-road, for Mr. H. Haines; conversion into shops, 716 and 718, London-road, for Mr. J. Gann.

SOUTHWARK.—Drainage plans passed by B.C.:—Guinness' Trust to Guinness' Buildings, Kennington-Park-road; The Union Cold Storage Co., Ltd., to Nelson's Wharf, Commercial Wharf; Beck & Pollitzer to New Buildings, Bear-gardens; The Lion Brewery Co. to the "Golden Fleece," Lant-street.

STANLEY.—Plans passed by U.D.C.: Alteration, Empire Club, Front-street, Stanley, for the Empire Club Committee; out-buildings at West Shield-row, for the South Derwent Colliery Co., Ltd.

STEPNEY.—Alterations and additions at 172A, White Horse-street, for Mr. E. Cannell; extension of front of premises, 111, New-road, Whitechapel, for Mr. A. H. Middleton.

FIRES.

KILMARNOCK.—An outbreak of fire has occurred at premises in Green-street, occupied by White, Brown & Co., wholesale linen manufacturers and by Mr. David Easton, motor merchant.

PAISLEY.—Damage estimated at £600 has been caused by an outbreak of fire in the clubhouse at the recreation ground of the Grammar School at Gateside.

PORT GLASGOW.—Damage estimated at between £50,000 and £60,000 has been caused by fire at William Hamilton & Co.'s premises.

WOKING.—Considerable damage has been caused by a fire which broke out at the aeroplane works of Messrs. Martinsyde.

* See also our List of Competitions, Contracts, &c.

PRICES CURRENT OF MATERIALS.*

[Owing to the exceptional circumstances which prevail at the present time, prices of materials should be confirmed by inquiry. Since our last issue lead prices have been revised.—Ed.]

BRICKS, &c.

Per 1,000 Alongside, in River Thames up to London Bridge.

	£ s. d.
Best Stocks	4 17 0

Per 1000, Delivered at London Goods Stations.

	£ s. d.		£ s. d.
Flettons	3 14 6	Best Blue Pressed Staffordshire	10 6 0
Best Stourbridge Fire bricks	12 13 6	Do. Bullnose	10 8 6
		Blue Wire Cuts	8 8 6
GLAZED BRICKS—			
Best White, Ivory, and Salt Glazed Stretchers	28 10 6	D'ble Str'tch'rs	36 0 0
		D'ble Headers	33 0 0
Headers	28 0 0	One Side and two Ends	37 0 0
Quoins, Bullnose and 4½in Flats	34 0 0	Two Sides and one End	35 10 0
		Splays and Squints	35 10 0

Second Quality, £1 per 1,000 less than best. Cream and buff, £2 extra over white. Other colours, Hard Glaze, £5 10s. extra over white.

	s. d.		
Thames Ballast	19 6	per yard,	delivered
Pit Sand	25 0		
Thames Sand	25 6	„ „	2 miles
Best Washed Sand	25 6	„ „	radius
½in. Shingle for Ferro-Concrete	24 6	„ „	Paddington.
¼ in. „ „	25 6	„ „	

Per ton delivered in London area.

	£ s. d.		£ s. d.
Best Portland Cement	4 7 6	..	4 13 0
80/6 alongside at Vauxhall in 80-ton lots.			
Ferrocrete per ton extra on above.	.. ..		10 0
Best Ground Blue Lias Lime	2 19 6	at rly. depot.	

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks. The sacks are charged at 2s. 6d. each and credited at 2s. each if returned in good condition within three months.

Grey Stone Lime ..... 75s. 0d. per ton delivered.
Stourbridge Fireclay in s'cks 44s. 6d. per ton at rly. dpt.

STONE.

BATH STONE—delivered in railway trucks at Westbourne Park, Paddington, G.W.R., or South Lambeth, G.W.R.. per ft. cube..... s. d. 2 10½

Do. do. delivered in railway trucks at Nine Elms, L. & S.W.R.. per ft. cube 3 0½

Do. do. delivered on road waggons at Nine Elms Depot 3 1½

PORTLAND STONE—

Brown Whitbed, in random blocks of 20 ft. average, delivered in railway trucks at Nine Elms, L. & S.W.R., South Lambeth Station, G.W.R., and Westbourne Park, Paddington, G.W.R., per ft. cube 4 7

Do. do. delivered on road waggons at above stations, per ft. cube.. ..... 4 8

White basebed, 3d. per ft. cube extra.

NOTE.—½d ft. cube extra for every foot over 20 ft. *average*, and ½d. beyond 30 ft.

YORK STONE, BLUE—*Robin Hood Quality.*

Delivered at any Goods Station London. s. d.

Scappled random blocks	Per Ft. Cube	17 4
6 in. sawn two sides landings to sizes (under 30 ft. super.)	Per Ft. Super	11 10½
6 in. rubbed two sides, ditto	„	13 3½
3 in. sawn two sides slabs (random sizes)	„	5 3
2 in. to 2½ in. sawn one side slabs (random sizes)	„	3 2
1½ in. to 2 in. ditto, ditto	„	2 0

HARD YORK—

Delivered at any Goods Station London.

Scappled random blocks	Per Ft. Cube	13 3
6 in. sawn two sides landing to sizes (under 40ft. super.)	Per Ft. Super	10 3
6 in. rubbed two sides ditto	„	12 1
4 in. sawn two sides slabs (random sizes)	„	4 11
3 in. ditto, ditto	„	6 2½
2 in. self-faced random flags	Per Yard Super	16 2

WOOD.

GOOD BUILDING DEAL.

Inches	£ s.	
4 x 11	67 10	per standard
4 x 9	67 10	„
4 x 8	60 0	„
4 x 7	50 0	„
3 x 8	48 10	„
3 x 7	47 10	„
2½ x 7	47 10	„
3 x 6	45 0	„
3 x 11	65 0	„
2 x 11	65 0	„
3 x 9	57 10	„
2½ x 9	57 10	„
3 x 4½	47 10	„
3 x 4	47 10	„

PLANED BOARDS.

1 x 11	67 10	„
1 x 9	65 0	„

PLAIN EDGE FLOORING.

Inches		
¾	40/-	square
1	45/-	„
1¼	52/6	„
1½	66/-	„
1¾	75/6	„

TONGUED AND GROOVED FLOORING.

Inches		
1	52/-	square
1¼	65/-	„
1¾	75/-	„

WOOD (*Continued*).

MATCHINGS (BEST).

Inches		
¾	36/-	square
¼	42/6	„
1	54/-	„

BATTENS.

Inches	£ s.	
¾ × 2	45 0	per standard

SAWN LATHS.

Per bundle				0 6	6
Dry Wainscot Oak, per ft. super, as inch	0 3	6	to	0 4	0
¼ in. do.	0 3	0	..	—	
Dry Mahogany—Honduras, Tabasco, African, per ft. super, as inch	0 2	6	to	0 3	0
Cuba. Mahogany	0 4	0	to	0 4	6
Teak (Rangoon, Moulmein or Java), per load	75 0	0	to	85 0	0
American Whitewood planks, per ft. cube	0 18	0	to	1 4	0
Scotch Glue, per cwt.	10 0	0	..	—	
Liquid Glue, per cwt.	6 12	0	..	—	

SLATES.

1st quality slates from Bangor or Portmadoc in truck load delivered London area. Per 1,000 of 1,200.

		£ s. d.
Best Blue Bangor Slates,	24 by 12	56 10 0
„ „	22 by 12	46 0 0
First quality „	22 by 11	42 10 0
„ „	20 by 12	42 0 0
Best Blue Portmadoc	20 by 10	36 10 0
„ „	18 by 10	29 10 0
First quality „	18 by 9	24 5 0
„ „	16 by 10	22 15 0
„ „	16 by 8	18 0 0

TILES.

	Per 1,000 f.o.r. London. £ s. d.
Best machine-made tiles from Broseley or Staffordshire district	6 15 0
Ditto hand-made ditto	7 5 0
Ornamental ditto	7 2 6
Hip and valley tiles (per dozen)	0 15 0

METALS.

JOISTS, GIRDERS, &c., TO LONDON STATION PER TON—

	£ s. d.
R. S. Joists, cut and fitted	39 0 0
Plain Compound Girders	43 0 0
„ Stancheons	45 0 0
In Roof Work	49 0 0

WROUGHT-IRON TUBES AND FITTINGS—

(Discount off List for lot of not less than £15 net value delivered direct from works. 5 per cent. less above gross discounts, carriage forward if sent from London stocks.)

	Sizes up to and including ¼ in. Tubes.	Sizes up to and including 2in. Tubes.	Fittings.	Sizes 2¼ in. to 6 in. Tubes.	Fittings.
Gas	+ 7½	+ 5	— 5	— 2½	— 17½
Water	+17½	+15	Net	+ 6½	— 15
Steam	+28½	+26½	+ 5	+ 16½	— 12½
Gal. Gas	+32½	+30	+ 5	+ 22½	— 7½
„ Water	+45	+42½	+ 10	+ 32½	— 5
„ Steam	+57½	+55	+ 15	+ 45	— 2½

L.C.C. COATED SOIL PIPES—London Prices ex works.

	Pipe. s. d.	Bends, stock angles. s. d.	Branches, stock angles. s. d.
2 in. per yd. in 6 fts.	6 4	4 6	5 5
2½ in. „	7 3½	4 11½	6 9
3 in. „	9 0½	5 5	8 1½
3½ in. „	10 0	6 9	9 5½
4 in. „	10 11½	7 8	10 9½

RAIN-WATER PIPES, &c.

	Pipe. s. d.	Bends, stock angles. s. d.	Branches, stock angles. s. d.
2 in. per yd. in 6fts. plain	5 6	3 0	4 0
2½ in. „ „	6 0	3 6	5 0
3 in. „ „	7 2	4 4	6 8
3½ in. „ „	8 8	5 4	7 9
4 in. „ „	9 8	6 4	9 4

L.C.C. DRAIN PIPES,—9 ft. lengths. London Prices. 4 in., 13/6 .. 5 in., 16/6 .. 6 in., 19/11.

IRON—	Per ton in London. £ s. d.		£ s. d.
Common Bars	34 10 0	to	35 10 0
Staffordshire Crown Bars good merchant quality	35 0 0	..	37 0 0
Staffordshire "Marked Bars"	36 10 0	..	38 10 0
Mild Steel Bars	36 0 0	..	38 0 0
Steel Bars, Ferro-Concrete quality, basis price	36 0 0	..	38 0 0
Hoop Iron, basis price	44 0 0	..	46 0 0
„ „ Galvanised	62 0 0	..	66 0 0
Sheet Iron, and Soft Steel Black—			
Ordinary sizes to 20 g.	50 0 0	..	52 0 0
„ „ „ 24 g.	51 0 0	..	53 0 0
„ „ „ 26 g.	53 0 0	..	55 0 0
Sheets Flat Best Soft Steel, C.R. & C.A. quality—			
Ordinary sizes, 6ft by 2ft. to 3ft. to 20 g.	58 0 0	..	60 0 0
Ordinary sizes, 6ft. by 2ft. to 3ft. to 22 g. and 24 g.	59 0 0	..	61 0 0
Ordinary sizes, 6ft. by 2ft. to 3ft. to 26 g.	61 0 0	..	62 0 0
Flat and Galvanised Corrugated Sheets—			
Ordinary sizes, 6 ft. to 9ft. 20 g.	54 0 0	..	55 0 0

METALS (*Continued*).

	Per ton in London. £ s. d.		£ s. d.
Ordinary sizes, 6ft. to 9ft. 22 g. and 24 g.	55 0 0	..	56 0 0
Ordinary sizes, 6ft. to 9ft. 26 g.	57 0 0	..	59 0 0
Sheets Glavanised Flat, Best quality—			
Best Soft Steel Sheets, 6ft. by 2ft. to 3ft. to 20g. and thicker	56 0 0	..	58 0 0
Best Soft Steel Sheets, 22 g. and 24 g.	57 0 0	..	59 0 0
Best Soft Steel Sheets 26 g.	60 0 0	..	61 0 0
Cut Nails, 3in. to 6in.	47 10 0	..	48 10 0

(under 3in. usual trade extras.)

LEAD, &c.

Delivered in London.

	£ s. d.		
LEAD Sheet, English, 4 lb. and up	49 0 0	..	—
Pipe in coils	49 10 0	..	—
Soil Pipe	52 0 0	..	—
Compo pipe	53 0 0	..	—

NOTE—Country delivery, 30s. per ton extra; lots under 5 cwt., 1s. 6d. per cwt. extra. Cut to sizes, 2s cwt. extra.

Old lead, ex London area, at Mills per ton	29 0 0	..	—
Do., ex country, carriage forward per ton	30 0 0	..	—

COPPER—

Strong Sheet	per lb.	0 2 3	.. —
Thin „	„	0 2 4	.. —
Copper nails	„	0 2 3	.. —
Copper wire	„	0 2 4	.. —
TIN—English Ingots	„	0 2 9	.. —
SOLDER—Plumbers'	„	0 1 4	.. —
Tinmen's	„	0 1 9	.. —
Blowpipe	„	0 2 3	.. —

GLASS.

ENGLISH SHEET GLASS IN CRATES OF STOCK SIZES AND IN SQUARES IN ORDINARY SIZES.

	Per Ft.		Per Ft.
16 oz. fourths	7d.	32 oz. fourths	11d.
„ thirds	7½d.	„ thirds	1/-
21 „ fourths	9d.	Fluted, Obscured and	
„ thirds	9½d.	Enamelled Sheet,	
26 „ fourths	10d.	15 oz.	10d.
„ thirds	11d.	21 „	1/-

Extra price according to size and substance for squares cut from stock.

ENGLISH ROLLED PLATE IN CRATES OF STOCK SIZES. Per Ft.

⅛ Rolled plate	6½d.
3/16 Rough rolled and rough cast plate	7½d.
¼ Rough rolled and rough cast plate	8½d.
Figured Rolled, Oxford Rolled, Baltic, Oceanic Arctic, Stippolyte, and small and large Flemish white	7½d
Ditto, tinted	9½d.
Rolled Sheet	7d.
White Rolled Cathedral	7d.
Tinted do.	9d.

PAINTS, &c.

	£ s. d.
Raw Linseed Oil in pipes per gallon	0 8 5
„ „ „ in barrels „	0 8 7
„ „ „ in drums „	0 8 9
Boiled „ „ in barrels „	0 9 1
„ „ „ in drums „	0 9 3
Turpentine in barrels „	0 12 8
„ in drums (10 gall.) „	0 13 2
Genuine Ground English White Lead, per ton	81 10 0

(In not less than 5 cwt. casks.)

GENUINE WHITE LEAD PAINT—

"Father Thames," "Nine Elms," "Park," "Supremus" and other best brands (in 14 lb. tins) not less than 5 cwt. lots ..... per ton delivered 112 0 0

Red Lead, Dry (packages extra)	per ton	60 0 0
Best Linseed Oil Putty	per cwt.	1 7 0
Filocol	per cwt.	1 0 6
Size. X D Quality	fkn.	0 5 9

VARNISHES, &c.

	Per gallon. £ s. d.
Oak Varnish ..... Outside	0 18 0
Fine ditto ..... ditto	1 0 0
Fine Copal ..... ditto	1 1 6
Pale Copal ..... ditto	1 2 6
Pale Copal Carriage ..... ditto	1 4 6
Best ditto ..... ditto	1 14 6
Floor Varnish ..... Inside	0 19 0
Fine Pale Paper ..... ditto	0 18 0
Fine Copal Cabinet ..... ditto	1 2 6
Fine Copal flatting ..... ditto	1 0 6
Hard drying Oak ..... ditto	0 18 0
Fine Hard drying Oak ..... ditto	0 19 0
Fine Copal Varnish ..... ditto	1 0 6
Pale ditto ..... ditto	1 2 6
Best ditto ..... ditto	1 14 6
Best Japan Gold Size	0 16 6
Best Black Japan	1 0 9
Oak and Mahogany Stain (water)	0 17 6
Brunswick Black	0 11 9
Berlin Black	0 19 9
Knotting (patent)	1 18 6
French and Brush Polish	1 14 0
Liquid Dryers in Terebine	0 16 0
Culrass Black Enamel	0 7 0

* The information given on this page has been specially compiled for THE BUILDER and is copyright. Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the highest or lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

CURRENT PRICES FOR BUILDING WORK IN LONDON.*

EXCAVATOR.

		s.	d.
Digging and throwing or wheeling and filling carts, and carting away to shoot—6 ft. deep	per yard cube	24	6
Add if in clay	„ „	2	0
Add for every additional depth of 6 ft.	„ „	1	6
Planking and strutting to trenches	per foot super	0	7½
Do. to sides of excavation, including shoring	„ „	1	6

CONCRETOR.

		s.	d.
Portland cement concrete in foundation 1 to 6 ..	per yard cube	55	0
Add if in underpinning in short lengths	„ „	10	0
Add if in floors 6 in. thick	„ „	4	0
Add if in beams	„ „	5	0
Add if aggregate 1 : 2 : 4	„ „	15	0
Add for hoisting not exceeding 10 ft. beyond the first 10 ft.	„ „	4	6

BRICKLAYER.

		£	s	d.
Reduced brickwork in lime mortar and Fletton bricks	per rod	50	5	0
Add if in stocks	„	12	10	0
Add if in Staffordshire blues	„	34	10	0
Add if in Portland cement and sand	„	4	15	0
FACINGS.				
Extra for facing in English or Flemish bond for every 10s. per 1,000 over the price of the common bricks	per ft. super	0	0	1¼
POINTING.				
Neat flat strucks or weathered joint.....	„ „	0	0	3½
ARCHES.				
Extra only to the price of ordinary brickwork :—				
Fair external in half brick rings	„ „	0	1	0
Axed in stocks	„ „	0	2	0
Rubbed and gauged jointed in putty camber or segmental	„ „	0	7	0
SUNDRIES.				
Damp course in double course of slates breaking joint and beaded in Portland cement	„ „	0	1	8
Setting ordinary register grates and stoves	each	1	5	0
Setting kitchener, including fuming flues, &c., with all necessary fire bricks	„	6	15	0

ASPHALTER.

		s.	d.
Half-inch horizontal damp course	per yard sup.	9	0
Three-quarter-inch vertical damp course	„ „	14	3
One inch on flats in two thicknesses.....	„ „	12	0
Angle fillet	per foot run	0	3
Skirting and fillet 6 in. high	„ „	1	6

MASON.

		s.	d.
York stone templates fixed	per foot cube	22	0
York stone sills fixed	„ „	35	0
Bath stone and all labour fixed	„ „	16	9
Portland stone fixed	„ „	25	9

SLATER.

		s.	d.
Welsh 16 in. × 8 in. 3 in. lap, including nails....	per square	98	0
Do. 20 in. × 10 in. Do. Do.	„	115	0
Do. 24 in. × 12 in. Do. Do.	„	117	6

CARPENTER AND JOINER.

		s.	d.
Fir framed in plates .....per foot cube		9	6
Do. joists	„ „	10	6
Do. roofs, floors and partitions	„ „	11	9
Do. trusses	„ „	14	0

		¾″	1″	1¼″	1½″
Deal rough close boarding	per sq.	60/–	81/–	100/–	108/–

		s.	d.
Flat centering for concrete floor, including struts or hangers .. „		68	0
Do. to beams .....per ft. sup.....		1	10
Centres for arches ..... „		2	4
Gutter boards and beams..... „		1	9

FLOORING.		¾″	1″	1¼″	1½″
Deal-edges shot	per sq.		82/–	104/–	120/–
Do. tongued and grooved	„		88/–	110/–	127/–
Do. matchings	„	74/–	89/–		
Moulded skirting, including backings and grounds .....per ft. sup.		2/4	2/8	3/2	3/8

SASHES AND FRAMES.		s.	d.
One-and-a-half moulded sashes or casements	per foot super	2	0
Two Do. Do. Do.	„ „	2	6
Add for fitting and fixing	„ „	0	6
Deal-cased frames with 1 in. inner and outer linings, 1½ in. pulley stiles tongued to linings, hard wood sills with 2 in. moulded sashes in squares double hung, double hung with pulleys, lines and weights ; average size.....	„ „	5	6

DOORS.		1½″	1¾″	2″
Two-panel square framed .....per ft. sup.		2/8	2/11	3/1
Four-panel Do.	„	3/–	3/4	3/7
Two-panel moulded both sides	„	3/4	3/7	3/10
Four-panel Do. Do.	„	3/8	3/11	4/2

CARPENTER AND JOINER—continued.

FRAMES.		s.	d.
Deal wrot moulded and rebated	per foot cube	22	0

		1″	1¼″	1½″
Plain deal jamb linings framed	per ft. sup.	2/3	2/5	2/9
Deal shelves and bearers	„	2/–	2/2	2/3
Add if cross tongued	„	2/–	2/–	2/–

STAIRCASES.	1″	1¼″	1½″	2″	2½″
Deal treads and risers in and including rough bracelets	3/4	4/–	4/8	—	—
Deal strings wrot in both sides and framed ..... „	4/6	4/9	—	—	—

		s.	d.
Housings for steps and risers	each	1	0
Deal balusters, 1 in. × 1¼ in.	per ft. run.	0	9
Mahogany handrail ; average 3 in. × 3 in.	„ „	6	3
Add if ramped	„ „	12	6
Add if wreathed	„ „	25	0

FIXING ONLY IRONMONGERY (INCLUDING SCREWS).

6 in. barrel bolts	9d.	Rim locks	2/6
Sash fasteners	1/–	Mortice locks	5/6
Casement fasteners	1/6	Patent spring hinges and letting in to floor and making good 20/-	
Casement stays	1/3		
Cupboard locks	1/6		

FOUNDER AND SMITH.

		s.	d.
Rolled steel joists	per cwt.	44	10
Plain compound girders	„	48	10
Do. stanchions	„	50	10
In roof work	„	54	10

RAIN-WATER GOODS.

		3″	4″	5″	6″
Half-round plain rebated joints ..	ft. run	2/–	2/6	3/9	4/3
Ogee Do. Do. ..	„	2/6	3/3	4/–	5/–
Rain-water pipes with ears	„	2/11	3/9		
Extra for shoes and bends	each	4/7	6/3		
Do. stopped ends	„	2/–	2/6	3/9	4/3
Do. nozzles for inlets	„	2/3	2/9	4/–	4/6

PLUMBER.

		s.	d.
Milled lead and laying in flashings and gutters	per cwt.	79	0
Do. Do. in flats	„	74	0
Extra labour and solder in coated cesspools	each	8	0
Welt joint	per ft. run.	0	6
Soldered seam	„ „	2	3
Copper nailing	„ „	0	8

		½″	¾″	1″	1½″	2″	4″
Drawn lead waste	per ft. run	1/2	1/11	2/3	4/–	5/–	
Do. service	„	1/10	2/5	3/–	4/9		
Do. soil	„						8/-
Bends in lead pipe	each					4/–	10/-
Solderer's stop ends	„	1/6	2/–	2/6	3/6	4/3	
Red lead joints	„	1/1	1/4	1/7	2/4	3/–	6/-
Wiped soldered joints	„	3/6	4/3	5/–	6/–	8/–	12/-
Lead traps and cleaning screws	„				18/–	24/–	
Bib cocks and joints ..	„	7/6	11/3	18/–	48/–		
Stop cocks and joints	„	18/–	20/–	30/–	75/–		

PLASTERER.

		s.	d.
Render, float and set in lime and hair	per yard sup.	3	4
Do. Do. siripite	„ „	3	9
Do. Do. Keen's	„ „	5	0
Add sawn lathing	„ „	2	0
Add metal lathing	„ „	3	0
Portland cement screed	„ „	3	0
Do. plain face	„ „	4	6
Mouldings in plaster	per 1 girth	0	3
One-and-a-half granolithic pavings	per yard sup.	6	9

GLAZIER.

		s.	d.
21 oz. sheet plain	per foot sup.	1	10
26 oz. Do.	„ „	2	0
Obscured sheet	„ „	2	3
⅛ in. rolled plate	„ „	1	3½
¼ in. rough rolled or cast plate	„ „	1	4½
½ in. wired cast plate	„ „	1	9½

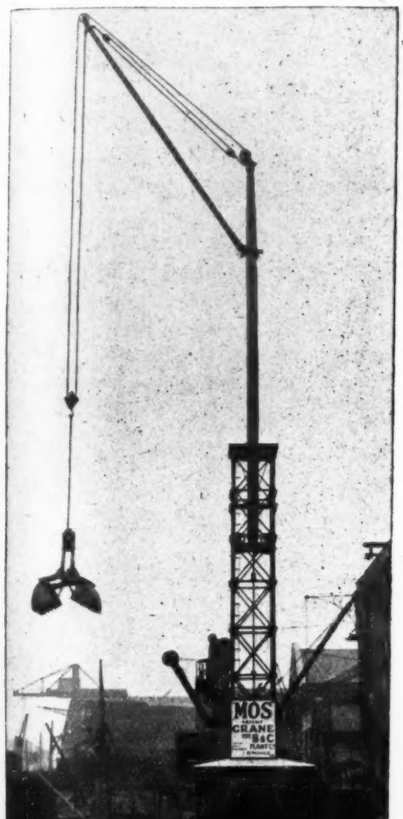
PAINTER.

		s.	d.
Preparing and distempering, 2 coats	per yard sup.	1	6
Knotting and priming	„ „	1	0
Plain painting 1 coat	„ „	1	6
Do. 2 coats	„ „	2	4
Do. 3 coats	„ „	3	2
Do. 4 coats	„ „	4	0
Graining	„ „	3	0
Varnishing twice	„ „	2	6
Sizing	„ „	0	4
Flatting	„ „	0	9
Enamel	„ „	2	0
Wax polishing	per foot sup.	0	11
French polishing	„ „	1	9
Preparing for and hanging paper	per piece 2/– to 5/-		

* These prices apply to *new buildings only*. They cover superintendence by foreman and carry a profit of 10% on the prime cost without establishment charges. A percentage of 1¼ should be added for Employers' Liability and National Health and Unemployment Acts and from 1s. 6d. per £100 for Fire Insurance. The whole of the information given on this page is copyright.

THE "MOS" CRANE.

The illustration below gives a better view of the "Mos" crane, which we fully described in our last issue. This crane is in use on the construction of some large works at Stepney, and was erected in 15 minutes by its own power without the aid of elaborate scaffolding. The crane was supplied by Messrs. Builders & Contractors Plant Ltd., 15, Victoria-street,



Westminster, S.W.1, to the order of Mr. J. E. White, the contractor for the work, of 89, Newington Butts, S.E.

Redbourn Village, Frodingham.

We are informed that further progress has now been made with the Redbourn Village housing scheme, for which Messrs. Sheppard & Harris are the architects, since the notes published in our last issue were prepared. There are now 247 houses in course of erection, 121 are nearing completion, and 50 have been handed over and occupied.

Commercial Motor Vehicles.

The last Commercial Motor Show was held in July, 1913. In the interval motor transport has undergone the most tremendous test that could ever have been imagined. More experience has been gained under the four and a-half years of war conditions than could have been secured in twenty years of normal use. The result of this experience will be seen at the Olympia Show. *The Commercial Motor* will deal with the Show in three special issues. The first is published this week, and the other two will be published on October 12 and 19 respectively.

TENDERS.

Communications for insertion under this heading should be addressed to "The Editor," and must reach him *not later than first post on Wednesday.*

* **Denotes *accepted.*** † **Denotes *provisionally accepted.***

‡ **Denotes *recommended for acceptance.***

§ **Denotes *accepted subject to modifications.***

BASFORD.—For the construction of sewerage and sewerage disposal works in the parish of Codnor Park, for the R.D.C. Mr. S. Maylan, Engineer and Surveyor, Public Offices, Basford, Nottingham. Quantities by Engineer and Surveyor.

*E. Somerfield, West Bridgford	£2,058 8 11
H. Sewell, Ilkeston	2,100 0 0
A. Sykes, West Bridgford	2,268 0 0
H. C. Pullar & Co., Manchester	2,275 13 4
C. S. Tomlinson, S. Normanton	2,220 0 0
Evans Bros., Alfreton	2,330 11 7
G. P. Trentham, Ltd., Birmingham	2,370 6 8
Croft Granite Co., Croft, Leics.	2,500 0 0

BATH.—For painting Midland and Destructor Bridges, for the T.C. :—

*Hayward & Wooster.... £332 and £240

BATH.—For laying 1,500 super yards of reinforced concrete surface in Lower Bristol-road, for the T.C. :—

*E. Ireland..... At £1 0s. 6d. per yard

BROCKHOLES.—For the construction of eight houses in Oakes-lane, Brockholes, for the Thurstonland U.D.C. Messrs. J. Berry & Sons, architects, 3, Market-place, Huddersfield :—

†A. Firth & Sons (*Mason*), Shepley	£3,890 10 0
†J. Batley & Sons (*Joiner*), Netherthong	1,920 3 10
†T. Lockwood & Son (*Plumber*), Honley	902 0 0
†E. S. Jessop (*Plasterer*), Honley	850 0 0
E. S. Jessop (*Concreter*), Honley	280 0 0
†Spence & Co. (*Painter*) Honley	199 0 0
†W. E. Jowitt (*Slater*), Huddersfield	460 0 0

†Provisionally accepted, subject to the approval of the Ministry of Health.

H.M. OFFICE OF WORKS.—Tenders accepted during August :—

Building Works, &c.—Dollis Hill Research Station, erection of huts: Arthur S. Franklin, London, W.; sub-contractors for steelwork: The Somerville-Barnard Construction Co., Ltd., London, S.E.; Eastern District Post Office, External Painting: J. C. Carroll, London. E.; Eccles Telephone Exchange, alterations and additions: J. Gerrard & Sons (1920), Ltd., Swinton; General Post Office West, external painting: J. C. Carroll, London, E.; General Post Office South, external painting: Arding & Hobbs, Ltd. London, S.W.; Hamilton Post Office, alterations: John C. Burns & Co., Hamilton; Hampton Court Palace, drainage, &c.: Harry Offer, Ltd., Kingston; Harrogate New Sorting Office—Sub-contractors: asphalte: Tunstalls, Seysell & Limmer Rock Asphalte Co., Ltd., Leeds; Granolithic: Stuarts' Granolithic Co., Ltd., London, W.C.; painting: Charles Fenton & Sons, Leeds; patent glazing: W H. Heywood & Co., Huddersfield; plastering: Cowling & Hobson Leeds; slating: J. Shepherd, Harrogate; Holborn Telephone Exchange, erection: Geo. Slade & Co., Ltd., London, N.; Ipswich Training Department, adaptation: R. Bennett & Snare, Ltd., Ipswich; National Physical Laboratory, extension—Sub-contractors: asphalte: Salter Edwards & Co., Ltd., London W.; granolithic: Malcolm, MacLeod & Co., Ltd., London, E.; slating: Roberts, Adlard & Co., London, S.E.; Newcastle Ministry of Pensions, roofing: Engers & Rolfe, Ltd., London, E.; South-Western District Post Office, external painting: Alfred Bagnall & Sons, Ltd., Shipley; Tower (Temporary) Telephone Exchange erection: W. Walker-dine, Ltd., London, W.; Sub-contractors—glazing: W. J. Rasey, London, N.W.; plumbing (Labour): W. Penfold London E.: roofing: D. Anderson & Sons, Ltd., London, E.; slating: Ernest Mathews & Co., London, E.C.; tar paving: A. C. W. Hobman & Co., Ltd., London, S.E.; Western District Post Office, external painting: Arthur H. Inns, London, E.C.; Wimbledon Training Centre, alterations and additions: H. Hann, London, S.W.; Sub-contractors, asphalte: Salter, Edwards & Co., Ltd., London, W.

Engineering Services.—Inverness Post Office, heating apparatus: G. H. Nicoll & Co., Dundee; Ipswich Training Centre, electric wiring; Cecil Cooper & Co., Ltd., London, S.W.; Leeds Workshops, heating apparatus: H. Braithwaite & Co., Ltd., Leeds; Manchester Training Centre, various works: The Manchester Electrical Maintenance Co., Manchester.

CHISWICK.—For erection of flats at Paxton-road and Thames-road, for the U.D.C. :—

	Paxton-road. Blocks A & B. (8 Flats.)	Paxton-road. Block C. (2 Flats.)	Thames-road. Blocks A & B (6 Flats.)	Total of Columns 1, 2 & 3.	Paxton-road. Price if Tender accepted for 3 Blocks.	Paxton-road and Thames-road. Price if Tender accepted for all.
H. E. Stocking & Sons, Acton	£7,952 2 10	£1,750 18 11	£8,220 13 4	£17,923 15 1	£9,600	£17,800
F. G. Cressy, Chiswick	8,530 8 10	2,022 16 5	8,586 13 6	19,139 18 0	10,300	18,600
L. L. Leeder & Co., Chiswick	(No separate Tender)		—	—	10,379	—
T. Millman, Ealing	9,994 0 0	2,337 0 0	10,082 0 0	22,413 0 0	12,331	22,413
B. Colley & Sons, Ltd., Notting-hill	10,182 0 0	2,268 0 0	10,292 0 0	22,742 0 0	12,380	22,622

DARLINGTON.—For erection of 20 houses at Hurworth, for the R.D.C. :—

*T. Rogers £20,965 10

EAST GRINSTEAD.—For the erection of 102 houses, for the U.D.C. Quantities by Messrs Henry Cooper & Sons, 181, Queen Victoria-street, E.C. 4.

*James Bodle, Ltd., Eastbourne	£97,115 0 0
Dove Bros., Ltd., London	94 788 0 0
H. & E. Waters, Forest Row	98,550 2 0
R. Cook & Sons, Crawley	99.930 0 0
Banger's Concrete Construction Co., Ltd., East Grinstead	107,917 0 0
James Waters, & Son, Forest Row	108,105 10 9
Norman & Burt Burgess Hill	118,227 0 0

HEMEL HEMPSTEAD.—For the erection of 14 cottages in pairs at Flamstead, for the R.D.C. Mr. T. H. Lighbody, M.S.A., architect, 20, Marlowes, Hemel Hempstead.

*Nautilus Fire Co., Luton	£12,475
Cole & Co., Luton	14,467
Harpenden Building Co., Harpenden	13,901
Hammond & Son, St. Albans	13,580

* Accepted subject to approval by Ministry of Health.

HULL.—For the erection of workshop and garage, for the T.C. :—

*Hill & Ward, Hull..... £2,797

ILFORD.—For drainage at Thorold-road, for the U.D.C. :—

*G. Harber £566 10

LONDON.—For additions to the electricity generating station, for the Hammersmith B.C. :—

*H. H. Hollingworth & Sons, Peckham	£2,283
Welchman & Wise, S.W.7	2,550
Pasterfield & English, S.W.19	2,659

LONDON.—Supply of gangways, ladders, &c., at boiler-house of electricity department, for the Hammersmith B.C. :—

*Foster Construction Co., Ltd., Plaistow	£126
H. W. Journet & Co., Hammersmith	145
Stirling Boiler Co., Ltd., Westminster	220

LONDON.—For the erection of buildings on Jubilee-street and Clark-street site, for the Stepney B.C. :—

*E. A. Roome & Co., Hackney, E... £16,333

LONDON.—For paving Rolt-street with "Aztec" phalte," for the Deptford B.C. :—

*Constable, Hart & Co..... At 17s. 6d. per yard

LEWISHAM.—For the erection of 86 houses at Lewisham Park, for the B.C. :—

	Type "A" house, each	Type "B" house, each	Types "B" and "B4," per pair	Drainage, paths, fences and division walls for 86 houses.	Percentage of saving on estimated net cost required by contractor.
§Bovis, Ltd., W.1	£772 0 0	£986 0 0	£1,993 0 0	£7,293 0 0	25 %
Dawe Construction Co., Ltd., W.C.	885 0 0	1,131 15 0	2,334 0 0	5,000 0 0	Not stated
Griggs & Son, Cubitt Town	897 10 0	1,163 0 0	2,345 0 0	8,799 0 0	33⅓ %
Sabey & Sons, Islington	960 0 0	1,230 0 0	2,492 0 0	7,132 0 0	50 %
T. H. Sawyer & Son, Lewisham	930 13 5	1,198 0 0	2,400 1 5	9,052 1 5	25 %
Sir R. MacAlpine & Sons, Ltd., S.W.1	1,008 3 5	1,284 6 1	2,592 6 7	9,159 3 7	50 %
H. Kent, Lewisham	1,013 0 0	1,276 0 0	2,570 0 0	9,056 0 0	Not stated
O. Kennard, Sydenham	900 0 0	1,150 0 0	2,300 0 0	6,780 0 0	33⅓ %
Holliday & Greenwood, Ltd., Battersea	894 0 0	1,150 0 0	2,326 0 0	6,950 0 0	50 %
Arthur Vigor, Ltd., S.W.1	997 0 0	1,248 0 0	2,520 0 0	5,620 0 0	20 %
H. Boot & Sons, S.W.1	968 15 0	1,233 7 6	2,498 0 0	7,023 0 0	50 %

LONDON.—For construction of garage at Great Church-lane Depot, for the Hammersmith B.C. :—

*Archibald D. Dawnay & Sons, Ltd., Battersea.....	£1,220	0	0
Monk Bridge Manufacturing Co., York	1,237	15	0
Tees-Side Bridge & Engineering Works, Ltd., Middlesbrough	1,268	0	0
Structural Engineering Co., Stratford	1,351	0	0
Lambourne & Co., Ltd., Manchester	1,375	0	0
Ewart, Wells & Co., Ltd., London	1,380	0	0
Monitor Structural Steel Co., Bolton	1,420	0	0
A. & E. Constructors, Ltd., London	1,451	5	0
Smith & Pearson, Ltd., Dublin	1,453	8	4
J. Shewell & Co., Darlington..	1,522	0	0

LONDON.—For supplying and fixing compound girder, steel joists, &c., and coal store floor at generating station, for the Battersea B.C. :—
*A. D. Dawnay & Sons..... £790

NORMAN CROSS.—For the erection of 76 houses for the R.D.C. Messrs. A. W. & H. J. Wilson, AA.R.I.B.A., architects, Cumbergate, Peterborough. Quantities by the architects :—
*R. S. Jellings, Peterborough..... £70,990

ROWLEY REGIS.—For lay-out of Birmingham-road housing site, for the U.D.C. :—
*Currall, Lewis & Martin..... £25,889

RUGBY.—For removing and re-erecting roof of engine house at the Avon Water Works, for the R.D.C. J. H. Sharp, Surveyor to the Council :—
*Foster & Dicksee, Ltd., Rugby £869
F. Hollowell, Rugby 875

ST. MAWE.—Erection of eight houses, for the R.D.C. :—
* W. M. Long, Camborne ..... £972 per house

SOUTHEND-ON-SEA.—For banding chimney shaft at Sewage Works, for the T.C. :—
*G. G. Gold & Co..... £220

WARMINSTER.—For the erection of houses, on the Sambourne site, for the U.D.C. Mr. C. H. Lawton, architect; quantities by Mr. T. W. Price, Cardiff :—
*Chas. Eve, Lichfield—
16 semi-detached houses at £2,073 7s. 7d. per pair (parlour type).
12 semi-detached houses at £1,700 per pair (non-parlour).

WOODBRIDGE.—For erection of 68 houses, for the R.D.C. :—
*Dowsing and Scrutton, 4 at Otley, £3,581 5s. 8d., average cost per house, £895; *W. F. Cross, 6 houses, Clopton, 2 at Playford, 2 at Great Bealings, £1,828; 4 at Charsfield, £3,765; 4 at Dallinghoo, £3,785; 2 at Debach, £1,909; 4 at Burgh, £3,786; 4 at Grundisburgh, £3,769, and 16 at Trimley, £13,636, average, £910; *Fred Nunn, 4 at Hasketon, £3,254 4s., average £813 10s.; *Geo. Chandler, 4 at Hollesley, £3,536; 2 at Pettistree, £1,724, and 6 at Sutton, £5,208, average £5,872 10s.; *W. J. Boreham, 4 at Grundisburgh, £3,400, average £850.

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TRADE NEWS.

The "Alwazot" heat retainer (manufactured by Bell's Hot Water Syndicate, Ltd., Donington House, Norfolk-street, W.C. 2) is an attempt to improve the storage side of hot-water apparatus. The apparatus consists of a mixing chamber having a connection at one end to screw on to the end of the return pipe from the hot-water tank to the boiler. On the top of the mixing chamber is an upright piece of pipe reaching nearly to the top of the tank, and on the lower side is a flat brass valve which rests on its seating by its own weight, and is operated by a "curling strip" which bends when heated. When the fire or gas is lighted, warm water from the boiler rises to the top of the hot-water storage tank, causing the water in the top of the tank to flow back to the boiler down the vertical pipe and through the mixing chamber. When it is as hot as required for domestic purposes, the "curling strip" bends sufficiently upwards to open the brass valve, allowing a small quantity of cold water from the bottom of the tank to mix with the hot water, so sending a constant warm supply back to the boiler.

The Directors of Bell's United Asbestos Co., Ltd., have decided upon the payment on October 21 of an interim dividend on the ordinary shares, numbered 1 to 140,000 and 318,373 to 353,532 inclusive, of 1s. per share less income tax, and on the new ordinary shares, numbered 200,001 to 318,372 inclusive, of a proportionate amount, in accordance with the terms of issue as set forth in the circular dated November 26, 1919, being at the rate of 10 per cent. per annum, on account of the profits for the half-year ended June 30 last. The ordinary share transfer books will be closed from October 7 to 21, both dates inclusive.

Mr. Isak Rasanen (12–13, Poultry, E.C.2) asks us to state that the statement in "Housing" to the effect that the hot-air systems in use in Finland are unsuitable for this country (to which we referred in our last issue) does not apply to the "Ihanne" system, which differs entirely from the hot-air system. The "Ihanne" stores the heat in a series of brick batteries built into the wall, from which the heat radiates into the rooms.

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BETHNAL GREEN, LONDON, E.

A copy of "World-wide Publicity," published by Messrs. Fredk. E. Potter, Ltd., Advertising Agents, Imperial House, Kingsway, London, W.C., has just come to hand. It gives a good idea of the service up-to-date advertising agency can render to its clients, and reproduced in its pages are specimens of many advertisements designed and written by the firm.

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